INDIA
RUBBER WORLD

OUR
64th YEAR

A BILL BROTHERS PUBLICATION

AUGUST, 1953

... order mixed carloads or truckloads of...

CABOT **Sterling MT** (MEDIUM THERMAL)

CABOT **Sterling FT** (FINE THERMAL)

STERLING and VULCAN Furnace Blacks*

from a single Cabot plant location

* *Consult your Cabot agent for the combination of grades most suited to your individual manufacturing requirements.*

CABOT **GODFREY L. CABOT, INC.** BOSTON 10, MASS.

1 OF THESE 3

DU PONT AQUAREX* ME
DU PONT AQUAREX* WAQ
DU PONT AQUAREX* SMO

WILL MEET YOUR SPECIFIC NEED FOR A

Mold Lubricant
Wetting Agent
Latex Stabilizer

AQUAREX ME

A dry powder with *minimum* electrolyte content. For difficult latex compounding jobs, where electrolytes may cause flocking, *Aquarex* ME can be used to give the necessary stability. Dilute solutions of *Aquarex* ME provide excellent mold release, and the residue build-up is extremely small.

AQUAREX WAQ

An aqueous paste with the *same low electrolyte content* as *Aquarex* ME. If processing procedures permit the use of a paste product, cost savings may be realized without sacrificing any advantage of *Aquarex* ME.

AQUAREX SMO

Developed specifically for use in neoprene latex as a surface conditioning agent, *Aquarex* SMO is particularly effective in improving the smoothness and gloss of films deposited from neoprene latex compositions. *Aquarex* SMO can also be used to eliminate striations which sometimes appear when films are dipped from thick, heavily loaded neoprene latex compounds.

* REG. U. S. PAT. OFF.

WRITE OR PHONE OUR NEAREST DISTRICT OFFICE FOR FURTHER INFORMATION.

DISTRICT OFFICES:

Akron 8, Ohio, 40 E. Buchtel Ave.....HEmlock 3161
Atlanta, Ga., 1261 Spring St., N. W.....EMerson 5391
Boston 5, Mass., 140 Federal St. .....HAncock 6-1711
Chicago 3, Ill., 7 South Dearborn St...ANdover 3-7000
Detroit 26, Mich., 2068 Penobscot Bldg....
WOodward 1-6574
Houston 4, Texas, 4141 Dennis St.....ATwood 4565
Los Angeles 58, Cal., 2930 E. 44th St.....LOgan 5-6464
New York 13, N. Y., 40 Worth St. ....COrtlandt 7-3966
Wilmington 98, Del., 1007 Market St.....Wilm. 4-5121

DU PONT RUBBER CHEMICALS

DU PONT
REG. U. S. PAT. OFF.

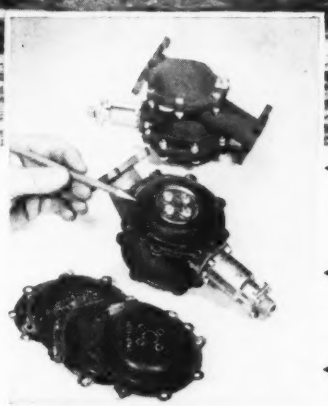
BETTER THINGS FOR BETTER LIVING... *THROUGH CHEMISTRY*

India Rubber World, August, 1953, Vol. 128, No. 5. Published monthly by Bill Brothers Publishing Corp. Office of Publication, 1309 Noble Street, Philadelphia, Pa., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U.S.A. Entered as Second Class Matter at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription United States and Mexico, $5.00 per year; Canada $6.00; All other Countries $7.00; Single Copies 50 cents. Address Mail to N. Y. Office.

Another new development using

B. F. Goodrich Chemical *raw materials*

PUBLIC LIBRARY
AUG 24 '53
DETROIT



←1
←2
←3

Valve made by Aero Supply Mfg. Co., Inc., Corry, Pa. Hycar rubber diaphragm molded by Vulcan Rubber Products, Inc., Brooklyn, N.Y. B. F. Goodrich Chemical Co. supplies the Hycar rubber only.

1. Completely assembled shut-off valve as used in the B-47 Stratojet. 2. Hycar rubber diaphragm in partially assembled valve 3. Hycar rubber diaphragms

"Thinking" valve needs Hycar for fast, safe refueling!

GASOLINE flow into wing tanks of B-47 Stratojets and C-124 Globemasters sometimes reaches 600 gallons per minute.

Shut-off valves—with Hycar rubber diaphragms—meet every requirement of speed and safety. Valves are located in the wing tanks. They are actuated automatically to stop fuel flow before tank capacity is reached. If the valve's rubber diaphragm were to fail under the terrific pressure, fuel would overflow . . . the fuel tank might rupture . . . the entire wing structure might be damaged. You can see the important part the Hycar rubber diaphragm has in successful refueling.

Hycar not only withstands extreme pressures, but also resists the deteriorating effects of aircraft fuel. It will not become brittle or crack with age. And Hycar also remains resilient and flexible through a temperature range required for this application of –65°F. to 167°F. The Hycar rubber is compounded to meet military specification MIL-R-6855, Class I.

Hycar rubber compounds have many advantages, are used in many industries. They resist heat and cold, abrasion, aging, gas, oil and many chemicals. They may help you improve or develop more saleable products. For information, please write Dept. HA-8, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar
Reg. U. S. Pat. Off.
American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON colors

The **Philblacks*** *help in many ways*

Your product's quality to raise!

Higher quality means fewer rejects! The proper Philblack helps your product pass the most rigid quality-control inspections with ease.

Philblack A turns out accurate moldings and smooth tubings. Makes products that look better. Gives a high-quality, satiny finish.

Philblack O adds toughness to products that need it. Manufacturers of industrial hose, conveyor belts and tire treads use this HAF black to reduce static electricity, too.

Philblack I fills the bill when you want extreme abrasion resistance. This new ISAF black (Intermediate Super Abrasion Furnace) delivers *durability plus!*—at *remarkably low cost!*

Philblack E has broken all records for abrasion resistance. It is actually a mileage marvel when used in cold rubber tire treads! And this SAF black prevents cut and crack growth, too.

For full information, consult our technical sales representative or write our nearest office.

PHILLIPS CHEMICAL COMPANY

PHILBLACK SALES DIVISION

318 WATER STREET · AKRON 8, OHIO

PHILBLACK EXPORT SALES DIVISION · 80 BROADWAY · NEW YORK 5, N. Y.

* A Trademark

The Philblacks are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago, and Trenton. West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

Rubber's unhurt by heat with OCTAMINE!

This specially developed antioxidant lets even the lightest rubber take heat, oxygen, and flexing in stride—with *minimum* discoloration or staining!

Now you can give *maximum* protection to tire carcass stocks without fear of staining by migration. Use Octamine in light-colored stocks for footwear, sponge, wire insulation, mechanical goods—wherever you need excellent antioxidant protection free of objectionable discoloration.

A granular, wax-like solid, Octamine has good storage stability, requires no handling precautions, is non-blooming, and has no appreciable effect on rate of cure.

And since Octamine is a true secondary amine, it is a strong antioxidant for all kinds of stocks, functioning equally well with or without carbon blacks.

Find out how Octamine can help you to finer rubber products, more economically. Send the coupon below.

Naugatuck Chemical

Division of **UNITED STATES RUBBER COMPANY** • Naugatuck, Conn.
IN CANADA: NAUGATUCK CHEMICALS DIVISION
Dominion Rubber Company, Limited, Elmira, Ontario

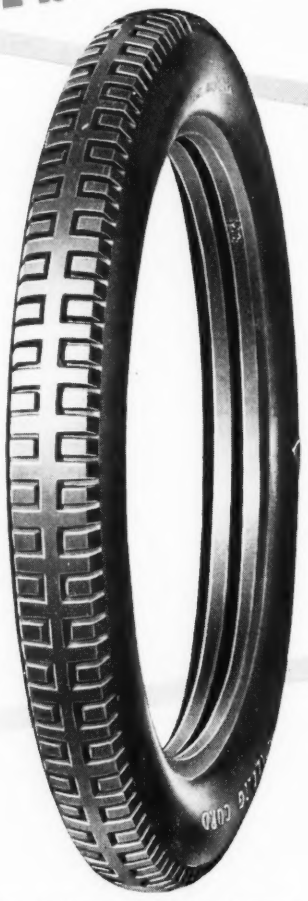
Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals
Reclaimed Rubber • Latices

Naugatuck Chemical, 138 Elm Street, Naugatuck, Conn.
Please send Octamine Compounding Research Report #20 to:

Name_____
Title_____
Company_____
Address_____
City_____ Zone_____ State____

REMEMBER THIS TREAD?

IT IS THE TREAD
OF THE SEIBERLING CORD—
FIRST TIRE TO BEAR
THE SEIBERLING NAME



FEW names are more deeply woven into the whole fabric of automobile tire making history than that of Seiberling. It was first heard in rubber circles around the turn of the century. Before the first decade was out, it had become one of the most prominent names in the vanguard of tire manufacturing.

Many of you in the industry today will remember the first tire to bear the Seiberling name, a straight-side cord, introduced in 1922. It significantly advanced the standards of the time for motoring safety and pleasure.

But long before 1922, Bridgwater's mold-making technology was advancing the standards of tire mold quality and performance. Since 1906, in fact, the Bridgwater Machine Company has worked closely with the tire industry, helping it meet continually expanding demands for automotive tires by furnishing quality-built molds for efficient, economical production of quality tires.

At Athens, Ohio, our Athens Machine Division meets today's tire mold requirements of the rubber industry quickly and precisely. It is the only plant in the world, we believe, where tire molds are made to the exclusion of any other manufacturing obligation.

Here, automotive tire molds of any size or type — in steel, cast iron or aluminum — are precision-manufactured by long experienced Bridgwater technicians and craftsmen. And their sole job is to produce higher quality tire molds at the favorable costs so familiar to the tire industry.

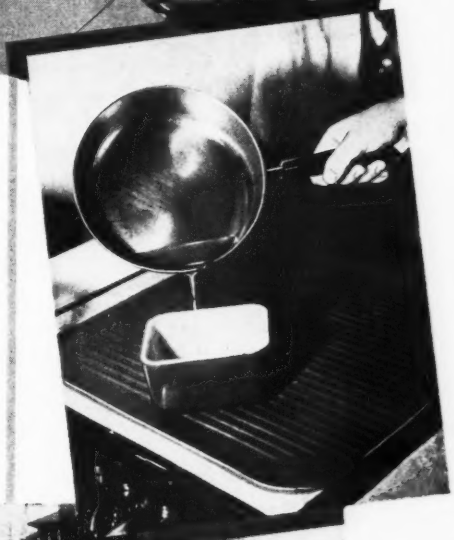
ATHENS MACHINE DIVISION

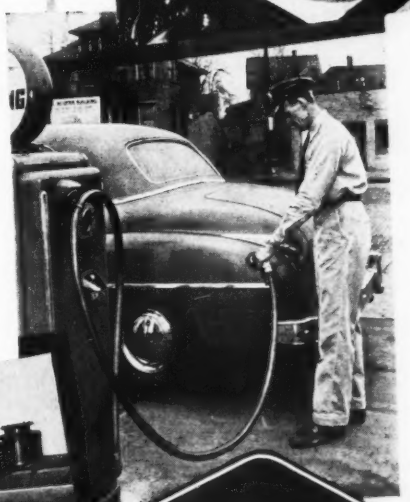
THE BRIDGWATER MACHINE COMPANY

Akron, Ohio

1782

Look where they're using Chemigum





TYPICAL CHEMIGUM USES

resisting heat, oil, grease, gasoline, solvents

Fuel Oil and Gasoline Hose
Pipe Line Connections
Printers' Rolls and Press Blankets
Valve Inserts
Gaskets for grease and solvent containers
Cements and Adhesives
Plasticizer for vinyls and phenolics
Oil-resistant Shoe Soles and Heels
Molded Automotive Parts
Cable Covers
Tank Linings
Hard Packing Compounds
Synthetic Ebonites
Coated Fabrics
Conveyor Belt Covers and Friction Compounds
Chemical Piping
Fuel Cells and Containers

Wherever close tolerances, physical properties and good appearance must be maintained, along with outstanding resistance to heat aging, oils, greases and solvents, you can count on CHEMIGUM. This use-proved Goodyear synthetic is the easiest-processing nitrile rubber you can use.

Ask for full details today by writing:

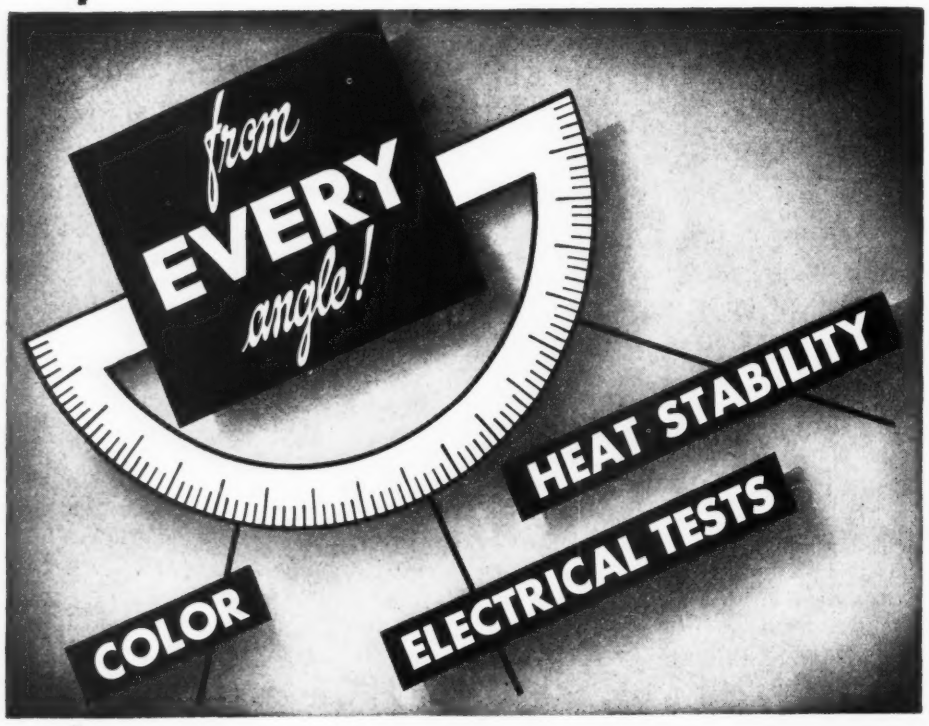
Goodyear, Chemical Division, Akron 16, Ohio

Chemigum, Pliobond, Pliolite, Pliovic—T. M.'s
The Goodyear Tire & Rubber Company, Akron, Ohio

CHEMICAL GOODYEAR DIVISION

We think you'll like
THE GOODYEAR TELEVISION PLAYHOUSE every other Sunday—NBC TV Network

Use-Proved Products — CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS — The Finest Chemicals for Industry



PIGMENT NO. 33

for Compounding

VINYLS AND SYNTHETIC RUBBER

Sample and technical data sent promptly on request

SOUTHERN CLAYS, Inc.

33 RECTOR STREET
NEW YORK 6, N. Y.

For Exceptional Clarity in Films—
look to and through

PLIOVIC
G80V

Properties of PLIOVIC G80V

Composition	100% Polyvinyl Chloride
Form	White Powder
Wet Sieve Analysis	100% through 40 mesh
Specific Gravity	1.40
Bulking Value	44 lb./cu. ft.
Intrinsic Viscosity	0.80
Solubility	Very Limited
Color	None
Taste	None

Here's picture proof—a 30 mil sheet of PLIOVIC G80V—fused at only 310° F. Note the glass-like clarity and complete absence of unfused particles.

Really different is PLIOVIC G80V—newest of the polyvinyl chloride resins by Goodyear.

Just introduced, PLIOVIC G80V is already setting new standards for fast, easy processing and exceptional film clarity at low temperatures. Processing and fusion temperatures as low as 310°-330° F. give increased production at decreased cost – without sacrifice of film quality.

PLIOVIC G80V is carefully polymerized to give the exact molecular structure and weight needed for rapid fluxing. It also is designed to resist heat and light, should extended processing or higher temperatures be used.

Films and sheeting made with PLIOVIC G80V have good physical properties and fabricating characteristics. Where desired, soft stocks for easy coating of fabrics and excellent penetration between fibers are readily produced.

Take a look at the properties of PLIOVIC G80V, then write for samples. Ask also about PLIOVIC G90V. Write to:

Goodyear, Chemical Division, Akron 16, Ohio

Chemigum, Pliobond, Pliolite, Pliovic—
T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

CHEMICAL
GOODYEAR
DIVISION

We think you'll like
THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

Use-Proved Products — CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS — The Finest Chemicals for Industry

Oronite POLYBUTENES

economical extenders of rubber

Oronite Polybutenes are clear, light colored, chemically stable liquids of moderate to high viscosity and tackiness. They have excellent aging characteristics. They do not become gummy or waxy, do not harden, darken or change in any essential property over long periods of atmospheric exposure. They can be readily emulsified using standard techniques and equipment.

Polybutenes can be used as a rubber extender in the manufacture of a wide variety of molded rubber products such as rubber boots, garden hose, hot water bottles. Besides extending rubber, Polybutenes plasticize the mass of rubber making it more pliable for easy milling.

Oronite Polybutenes are used in milling reclaimed rubber batches and have a field of usefulness in plasticizing various synthetic rubbers.

Oronite Polybutenes are available in four grades, based on viscosity. Complete information is available in a technical bulletin.

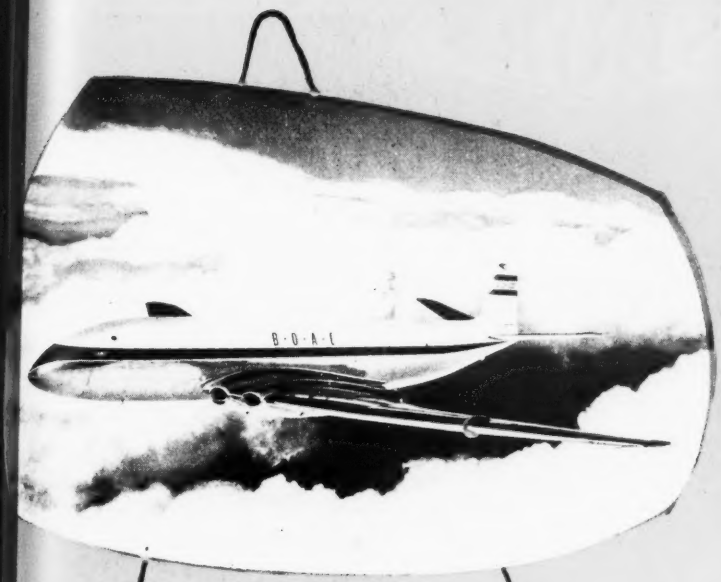
Write or phone the Oronite office nearest you and talk over your problem with us.

ORONITE CHEMICAL COMPANY

38 SANSOME STREET, SAN FRANCISCO 4, CALIFORNIA
30 ROCKEFELLER PLAZA, NEW YORK 20, NEW YORK
STANDARD OIL BLDG., LOS ANGELES 15, CALIFORNIA
600 S. MICHIGAN AVENUE, CHICAGO 5, ILLINOIS
MERCANTILE SECURITIES BUILDING, DALLAS 1, TEXAS

ORONITE CHEMICAL COMPANY
THE NAME TO WATCH IN CHEMICALS

2630



IN AIR TRANSPORTATION . . .

BOAC's De Havilland Comet—the world's first jet commercial airliner is the forerunner of the latest advance in luxurious air transportation. Its 500 m.p.h. speed further reduces our rapidly shrinking globe.

Setting new standards of **PROGRESS**

IN THE RUBBER INDUSTRY . . .

Constant advancement in service and progressive business management are the reasons why Muehlstein is a leading supplier to the rubber industry today as it has been for over 40 years.

H. MUEHLSTEIN & CO. INC.

60 EAST 42ND STREET, NEW YORK 17, NEW YORK

H OFFICES: Akron · Chicago · Boston · Los Angeles · Memphis · *WAREHOUSES:* Akron · Chicago · Boston · Los Angeles · Jersey City

CRUDE RUBBER, SYNTHETIC RUBBER, SCRAP RUBBER, HARD RUBBER DUST, PLASTICS

OSBORN

14 minutes by hand . . .
Now 3 minutes with push-button brushing

This strip act with Osborn wire brushes is taking off costly hours in the production of d-c motor armatures . . . typical of savings being discovered throughout industry with push-button brushing methods.

The job here is to remove enamel insulation from copper wires to assure top quality soldered connections. Formerly done by a tedious hand-scraping method, the time per armature was 14½ minutes. With the motor-driven brushing device shown the time has been cut to 3 minutes. As the armature is turned, a pair of Osborn Disc Center wire brush heads rotate downward on the wires and the insulation comes off clean.

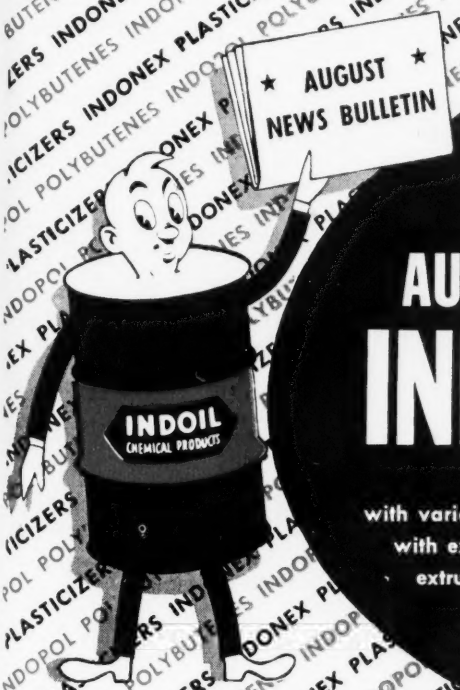
This is typical of thousands of production jobs which have been simplified with the help of the **O**sborn **B**rushing **A**nalyst. For help to improve *your* cleaning, finishing or deburring operations, call your **OBA** or write *The Osborn Manufacturing Company, Dept. CC-3, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

FREE: New booklet on deburring with Osborn Power Brushing. Write for your copy.

Osborn Brushes

OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES

INDOIL®
CHEMICAL PRODUCTS



for
EXTRUDED BUTYL AUTOMOTIVE COMPOUNDS
INDONEX PLASTICIZERS

REG. U.S. PAT. OFF.

with various carbon blacks give 37-92 Shore hardness compounds with excellent aging and weathering plus good handling and extrusion characteristics. Circulars 30, 39, and 45 show compounds meeting SAE-ASTM Specifications.

409-415-509-515-609-615-709-
806-809-906.

Send for:
Circulars 30, 39, 45
General Bulletin 13

INDOIL CHEMICAL CO.
910 SOUTH MICHIGAN AVENUE
CHICAGO 80, ILLINOIS

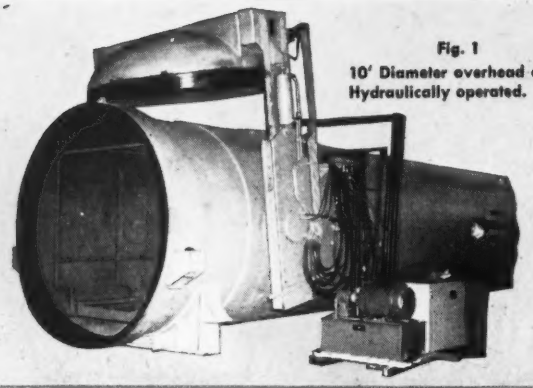


Fig. 1
10′ Diameter overhead door.
Hydraulically operated.

Quick Opening Doors

by STRUTHERS WELLS

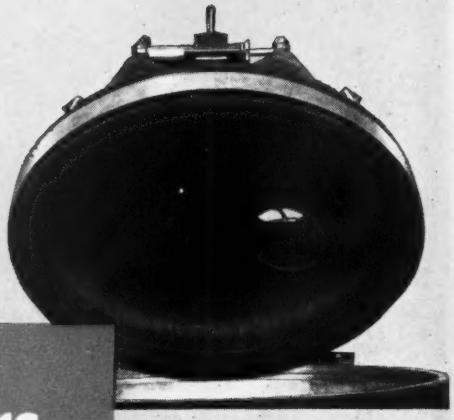


Fig. 2
5′ Diameter hinged door
for vertical vessel.

TYPES FOR ALL REQUIREMENTS
UP TO 600 PSI WORKING PRESSURE—
TO 700°F. MAXIMUM TEMPERATURE

Expanding Locking Ring Door

Struthers Wells expanding locking ring type doors as illustrated in Figures 1, 2 and 3 are made for vertical and horizontal use—in hinged and overhead types. A synthetic rubber gasket is self-sealing and is recommended for use to 400°F steam and pressures to 600 psi, depending on the size of vessel. Made in 3′ to 12′ diameters.

Lug Type Door

Struthers Wells lug type door (See Fig. 4) features a rectangular asbestos gasket in a groove—for severe operating conditions of temperature and hard to hold chemicals. Quickly and easily operated for rugged service conditions, this type door is furnished with anti-friction hinge bearings, and hydraulic unit for locking and unlocking door.

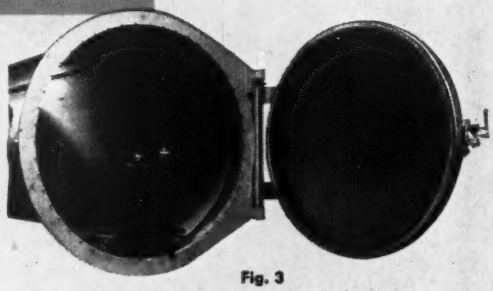


Fig. 3
12′ Diameter hinged door
for horizontal vessel.

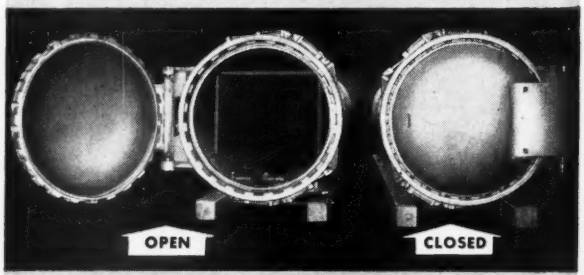


Fig. 4
Ideal for wood preserving operations, hard to hold chemicals and high temperature service.

Struthers Wells

Consult Struthers Wells for Quick Opening Doors best suited to your specific requirements.

STRUTHERS WELLS CORPORATION

Process Equipment Division • **TITUSVILLE, PA.**

Plants at* TITUSVILLE, PA. • WARREN, PA. • *Offices in Principal Cities

Introducing
Buffalo's
Flo-Mix 66
A new faster mixing type of reclaim

It's powdered! It pours! It's priced right!

This new Buffalo reclaim brings you all these important advantages:

1. Lower cost rubber hydrocarbon.
2. Faster mixing and blending.
3. Cleaner and more economical to handle.
4. Packaged in bags of uniform weight.
5. Adaptable for automatic weighing and handling.

A general purpose reclaim, Flo-Mix 66 is especially suited for tire frictions, treads and sidewalls, molded mechanicals, footwear, soles and heels and industrial belting. We'd like to send you all the details and a short note from you will start them on the way.

Always keep reclaims in your formula and always look to U. S. for the best. U. S. Rubber Reclaiming Company, Inc., P. O. Box 365, Buffalo 5, N. Y.

Trenton agent: H. M. Royal, Inc., 689 Pennington Ave., Trenton, N. J.

U.S.

70 years serving the industry solely as reclaimers

U.S. RUBBER RECLAIMING COMPANY, INC.

BURGESS SUN RESISTOR #1150

for TIRE COMPOUNDING

SUN RESISTOR #1150 is used in substantial quantities in tire compounding, mechanical goods, insulated wire and cable compounds, and other rubber goods.

- Recommended Usage: 2-4% of the weight of the rubber hydrocarbon, depending on the degree of protection desired.
- Unlimited availability.
- Low cost.
- Available in convenient slabbed forms.

Ask your Burgess representative for technical data, working samples, and prices.

Burgess Pigment COMPANY

EXECUTIVE SALES OFFICES: 64 HAMILTON ST., PATERSON 1, N. J.
WAREHOUSES: TRENTON, NEW JERSEY • SAYLESVILLE, RHODE ISLAND • AKRON, OHIO • LOS ANGELES, CALIFORNIA

HYDROUS AND ANHYDROUS ALUMINUM SILICATE PIGMENTS, KAOLIN CLAYS, "ANTISUN" SUN CHECKING AGENT, PLASTICIZERS, RECLAIM PROCESSING OILS, GILSONITE COMPOUNDS, CURE ACTIVATORS.

Experience, a necessary ingredient in the manufacture of any product, is especially essential in roll making where only by long and intimate association with an industry, can its requirements be thoroughly understood and successfully provided for.

To United's 50 years of roll making experience can be added the advantages of its continuing program of metallurgical research, basically sound engineering and modern production facilities—a combination that made, and has kept, United Rolls favorites in outstanding processing plants throughout the world.

• • •

When in need of rolls—for whatever requirement—consult us.

UNITED ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh · Vandergrift · New Castle
Youngstown · Canton

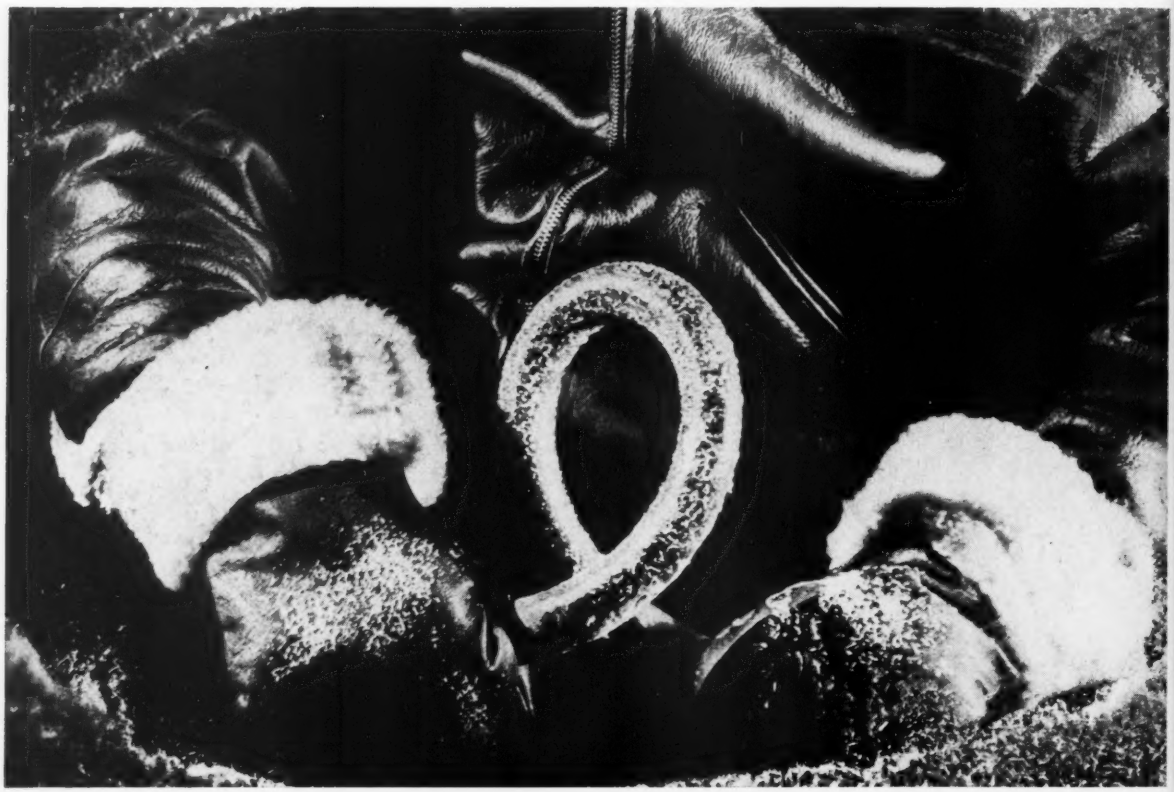
Subsidiaries: Adamson United Company, Akron, Ohio
Lobdell United Company, Wilmington, Delaware
Stedman Foundry and Machine Co., Inc., Aurora, Ind.

Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

Specify Thiokol®

PLASTICIZER TP-90-B

for maximum LOW TEMPERATURE flexibility



"Thiokol" Plasticizer TP-90-B imparts maximum low temperature flexibility to natural rubber, Neoprene, nitrile-type rubbers, and GR-S. It is highly compatible with these elastomers and does not appreciably impair their physical properties, even at high concentrations. "Thiokol" TP- 90-B is an *efficient* plasticizer.

Many compounders are already aware of the advantages of using "Thiokol" TP-90-B in many critical applications. They specify this high-quality plasticizer for low temperature fuel hose, cellular rubber products and a variety of extruded and molded goods. Actual service performance proves that "Thiokol" TP-90-B will meet their most rigorous low temperature requirements.

Make it a point to try it too! Write today for technical information and samples.

Thiokol CHEMICAL CORPORATION • 784 North Clinton Avenue, Trenton, New Jersey

lity

low
and
erv-
90-B
uire-

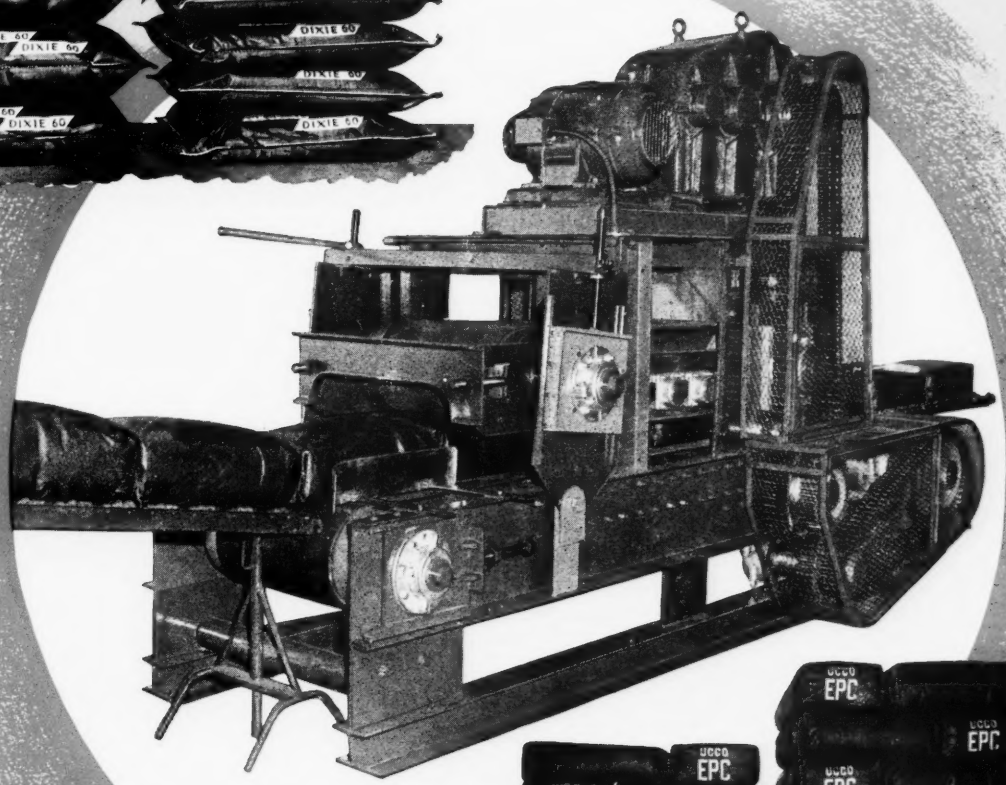
nical

ersey
ORLD

UNITED'S NEW PACKAGING DEVELOPMENT

Our ROLLPAC saves the rubber industry more than 20% in storage and shipping space.

Six-wall export bags of carbon black before and after the ROLLPAC operation



ROLLPAC
Patents Applied For

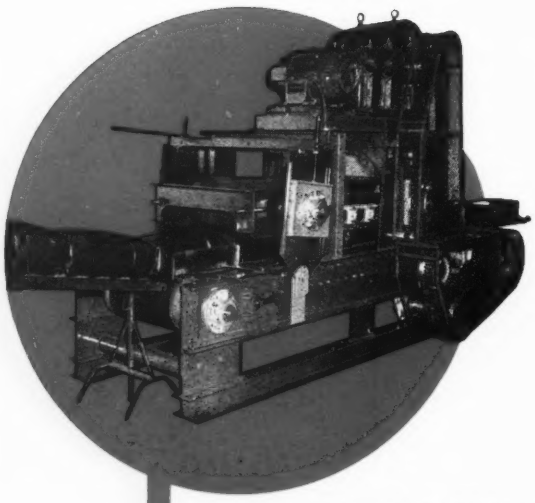
Three-wall domestic bags of carbon black before and after the ROLLPAC operation

UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

NEW YORK • AKRON • CHICAGO • BOSTON

CANADA: CANADIAN INDUSTRIES, LIMITED

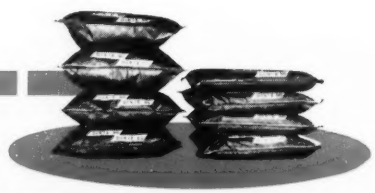


UNITED CARBON has developed the ROLLPAC as a useful and economic aid in the handling and shipping of carbon black. The photographs appearing on the front indicate graphically the saving in storage and shipping space which the ROLLPAC bag press makes possible — a saving in excess of 20 per cent.

The flattened bags, with their greater compactness and stability, besides being easier to stack, are easier to handle on pallets and lock better in stacking, thereby shifting less in transit.

ROLLPACS have been installed in all UNITED CARBON plants.

All carbon black manufacturers are free, upon request, to use this device, on which patent application is pending, without charge. This is done so that all users of dustless carbon black may have the advantage of this space-saving method.



UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

NEW YORK • AKRON • CHICAGO • BOSTON

CANADA, CANADIAN INDUSTRIES, LIMITED

RELIABLE ZINC OXIDES

AZO-ZZZ-44 and AZO-ZZZ-55 assure good dispersion and easy processing because of their uniform particle size and absence of extreme fines. With AZO-ZZZ-11, 22, 33, (Acicular types) and special grades, a complete range of zinc oxides is offered for every rubber requirement.

A RELIABLE SOURCE

American Zinc assures an uninterrupted supply of zinc oxide. Recent discovery and development of a new, large ore body, added to previous American Zinc reserves, provides sufficient ore to last many years at the current rate of production.

AZO **ZZZ-44**
ZZZ-55

AMERICAN ZINC SALES COMPANY

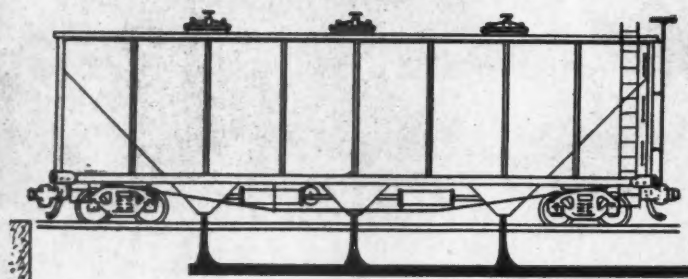
distributors for

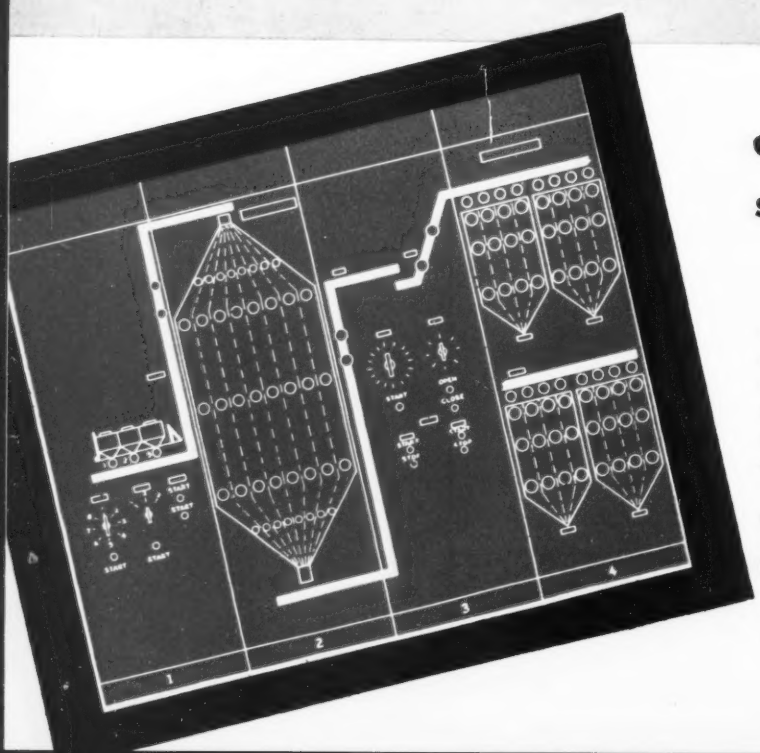
AMERICAN ZINC, LEAD & SMELTING COMPANY

COLUMBUS, OHIO • CHICAGO • ST. LOUIS • NEW YORK

Bulk Handling Plant

FOR CARBON BLACK





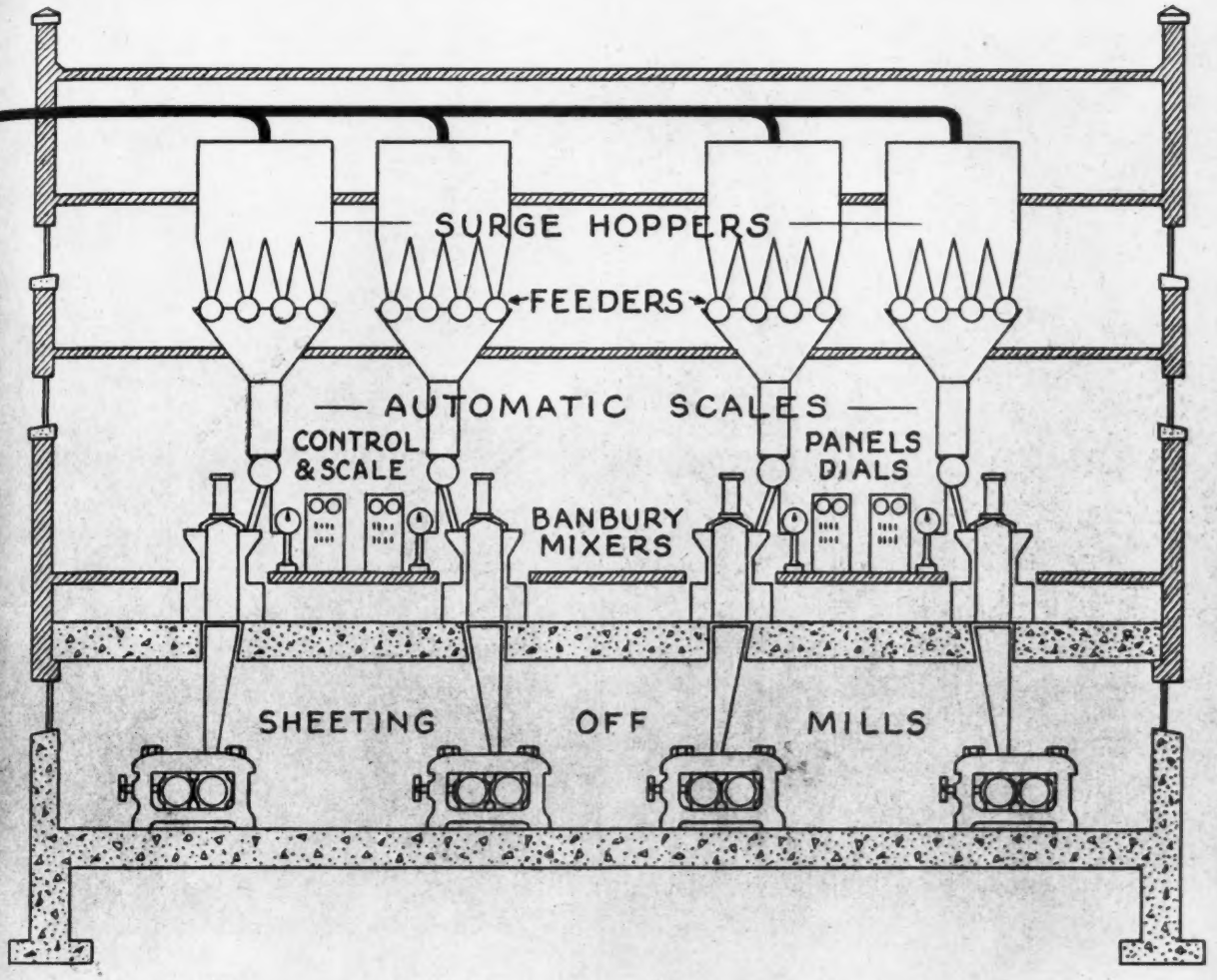
complete *Push Button* storage to surge hoppers

Hale and Kullgren has taken the mess out of carbon black. Carbon black moves from railroad cars into mixers . . . without a human hand touching the stuff. Automatic controls elevate, convey and weigh the black into mixers. The versatile system stores several kinds and types of black in carload lots . . . thus you have a variety of blacks available at each mixer. Push buttons on master control board route each black to its proper distribution.

This plant exemplifies the type of thinking which rubber and plastics are depending upon Hale and Kullgren to do.

COMPLETE SERVICE ON

a complete plant:
an engineering service



Automation from railroad cars to bulk over mixers . . . including *Automatic Weighing*

They design, engineer and build from the ground up. They make up the building specifications; install the equipment; furnish a complete operating and maintenance manual.

Whether you need a new carbon black plant, a rebuilding of your Banburys, an extruding line or a new process, call on Hale and Kullgren. They execute the whole job from idea to production . . . or any part thereof.

Address inquiries to: Hale and Kullgren, Inc., P. O. Box 1231, Akron, Ohio.

RUBBER AND PLASTICS

a specialized process: or individual machines

NE

National Erie products for the Plastic and Rubber Industries • Extruders • Simplex Doors for Autoclaves • Mills and Hydraulic Presses.

This old and well-known line of machinery was acquired March 1, 1952, by The Aetna-Standard Engineering Company. They are manufactured in their Warren, Ohio, and Ellwood City, Pa., plants. The sales and engineering of the National Erie line is the responsibility of Hale and Kullgren, Inc., Akron, O.

SALES and ENGINEERING by

HALE AND KULLGREN INCORPORATED

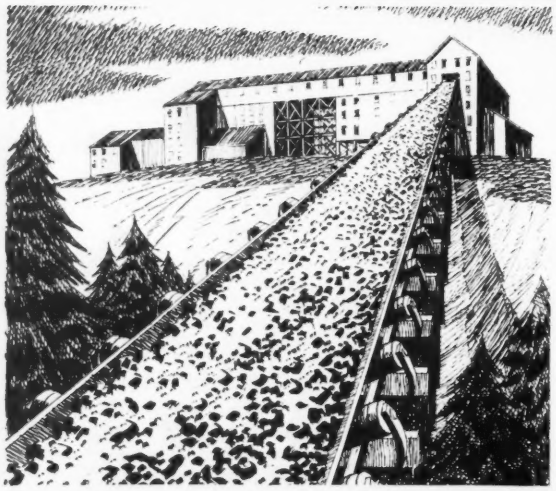
P. O. BOX 1231 • AKRON, OHIO

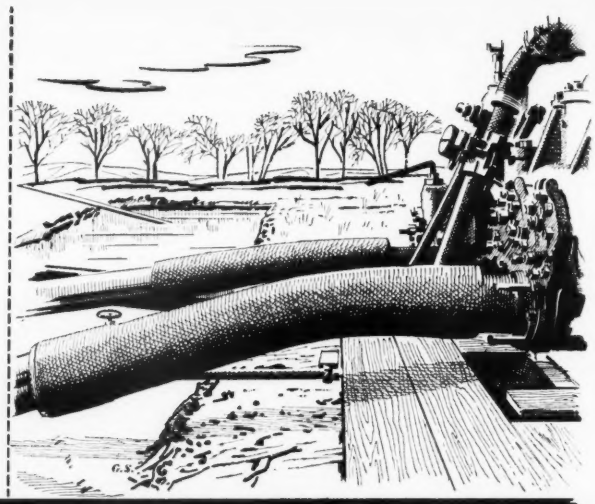
MANUFACTURING by

Aetna-Standard

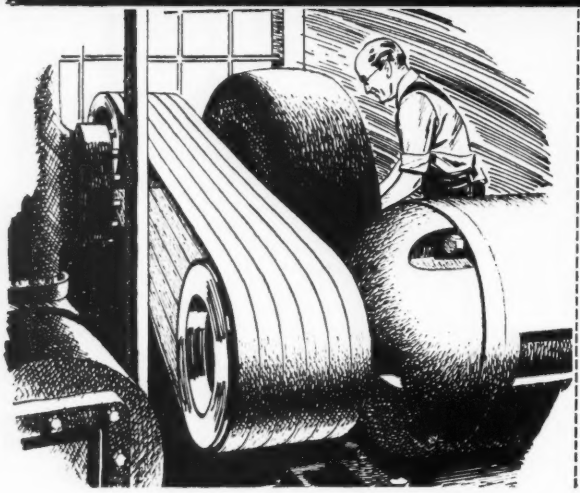
THE AETNA-STANDARD ENGINEERING CO.
PITTSBURGH, PA.

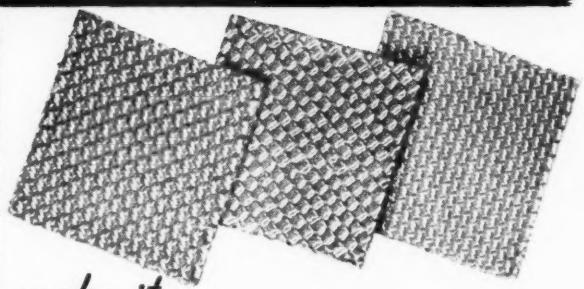
Plants in Warren, Ohio
Ellwood City, Penna.





If it's got to give DURABLE PERFORMANCE





make it "Wellington Sears Fabrics" superior for a wide variety of rubber applications

Any listing of Wellington Sears fabrics and their applications in the rubber industry can at best be but a partial one. In industry, the military and the home . . . in conveyor belts, hoses and other mechanical rubber goods . . . in pump and air compressor diaphragms, pontoons and raincoats . . . in thousands of rubber-and-fabric applications, you're sure to find Wellington Sears fabrics on the job.

Backed by more than one hundred years' experience in the industrial fabric field, Wellington Sears offers an extensive line of modern cotton and synthetic fabrics for rubber fabrication. These are available in standard, as well as special, constructions to meet unusual requirements.

Whatever the problem, a call or letter to your nearest Wellington Sears sales office will place at your disposal the facilities of this "headquarters for industrial fabrics" and its engineering-technical staff.

An illustrated 24-page booklet filled with valuable facts on fabric development and applications of interest to present and potential users of industrial fabrics is yours for the asking. Write for a free copy of "Modern Textiles for Industry" to Wellington Sears Co., Department K-6, 65 Worth Street, New York 13, N.Y.

Superior Fabrics for the Rubber Industry

- Belting duck
- Hose duck
- Enameling duck
- Army duck
- Single and plied-yarn chafers
- Sheeting
- Airplane cloth
- Balloon cloth
- Nylon, high-tenacity rayon, other synthetics and combinations.

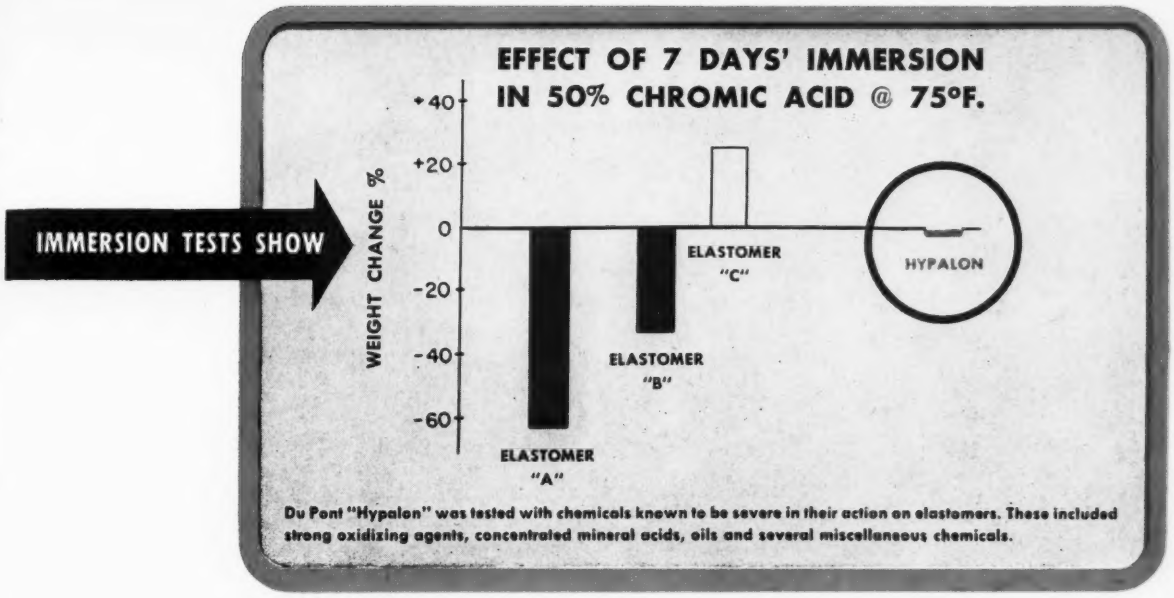
Wellington Sears

A SUBSIDIARY OF WEST POINT MANUFACTURING COMPANY

FIRST In Fabrics For Industry

WELLINGTON SEARS COMPANY, 65 WORTH STREET, NEW YORK 13, N. Y.

OFFICES IN: ATLANTA • BOSTON • CHICAGO • DETROIT • LOS ANGELES • NEW ORLEANS • PHILADELPHIA • SAN FRANCISCO • ST. LOUIS



DU PONT HYPALON*

CHLOROSULFONATED POLYETHYLENE

. . . sets new standards of chemical resistance

The exceptional chemical resistance of Du Pont "Hypalon" chlorosulfonated polyethylene suggests a wide variety of uses in the rubber industry—for "Hypalon" alone, as well as in blends with other elastomers.

Acid hose and linings for chemical handling equipment need a material that can stand up to many corrosive agents. Other uses suggested by this property of Du Pont "Hypalon" include tank linings, O-rings, gaskets and diaphragms.

And chemical resistance is only one of a unique combination of properties "Hypalon" offers. These properties point to such varied uses as electrical insulation and jacketing, footwear, floor covering, coated fabrics, automobile-tire sidewalls, automotive weather stripping, spark-plug boots, steam-hose coverings, conveyor-belt covers and molding forms and bags.

Perhaps Du Pont "Hypalon"—or a blend including "Hypalon"—can help you develop a new or improved product. "Hypalon" is now available in limited commercial quantities.

ONLY "HYPALON" OFFERS *ALL* THESE OUTSTANDING PROPERTIES

- **COMPLETE OZONE RESISTANCE**
- **EXCELLENT ABRASION RESISTANCE**
- **EXCELLENT WEATHER RESISTANCE**
- **GOOD HEAT RESISTANCE**—Suitable for continuous service up to 250°F. and intermittent service at higher temperatures.
- **EXCELLENT CHEMICAL RESISTANCE**
- **UNLIMITED COLOR POSSIBILITIES.** Does not require carbon black to achieve maximum physical properties.
- **EXCELLENT FLEX-LIFE**

* REG. U.S. PAT. OFF.

DU PONT
REG. U.S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY
Polychemicals
DEPARTMENT
PLASTICS • CHEMICALS

FOR FURTHER INFORMATION: Send today for technical literature on the properties, applications and compounding of Du Pont "Hypalon." Or, if you prefer, a Du Pont technical representative will call at your convenience.

E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Dept. 628, Du Pont Bldg., Wilmington 98, Delaware

I am interested in "Hypalon" for _____. Please ( ) send me literature. ( ) Have your technical representative call.

*Name*_____ *Title*_____

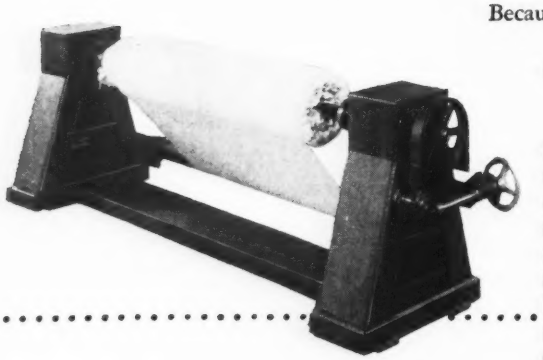
*Firm*_____

*City*_____ *State*_____

IOI STANDARD LET-OFFS and TAKE-UPS

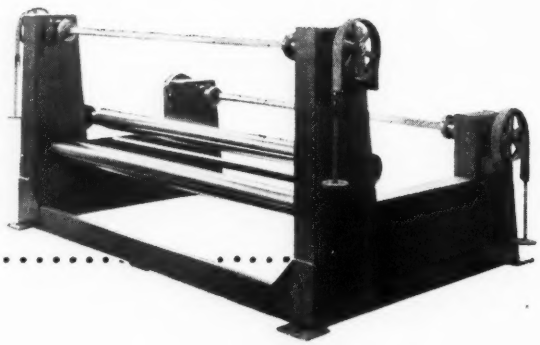
for TEXTILES, PAPERS, FILMS and FOILS

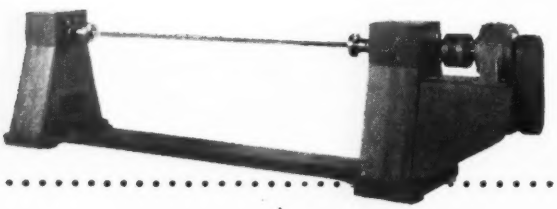
● In continuous handling and processing of web materials, proper unwinding and winding are of utmost importance. Because of their advanced engineering and accurate construction, IOI standard Let-Offs and Take-Ups provide the precision and control so essential to end-product quality in these operations.



Single Roll Friction-Type Let-Off—This IOI Let-Off provides a convenient method of holding tension on a mill roll of fabric or paper being fed into a system. The stand is so arranged to also provide for quick roll changes in minimum time. Construction is of fabricated members welded to a base, affording the same ruggedness as all other IOI products. Brake adjustment is by manual handwheel control, and affords easy tension control by the operator. These stands can also be furnished at a slightly lower cost by use of counterweighted friction holdback.

Dual Roll Friction-Type Let-Off—This IOI Let-Off provides a convenient method of continuously feeding rolls of fabric or paper at moderate speeds and tensions. Accurately machined slide retainer ring-type mandrels, simple tension devices, and accessibility to the unwinding rolls are but a few of the IOI design features. The friction holdback can be provided with either handwheel or counterweight control, as in the single roll stand, or with air friction-type clutch.





Single Roll Take-Up—An efficient windup stand of the bullhead pedestal type, this IOI system has the necessary provision for the application of wide varieties of system drives. The base, bullheads, winding shafts, and shaft mountings duplicate the unwinding stands. The drive illustrated is controlled by a tension unit which integrates the speed of the winding roll shaft in direct proportion to the roll diameter buildup. These stands are also used in tandem with a tension control accumulator and pull-out rolls to provide continuous winding.

These standard units (with or without drives) are available now, ready for prompt shipment. For complete information write:

INDUSTRIAL OVENS, INC.

13825 TRISKETT ROAD CLEVELAND 11, OHIO

The finest name
in Rutile Titanium Dioxide

Glidden ZOPAQUE*-R

...gives you a whiter white...and it's easier to grind

Glidden research has achieved greater whiteness and a highly accelerated dispersion rate in new Glidden ZOPAQUE-R. These new developments combine to produce pigments with exceptional hiding power, outstanding gloss and color retention and low reactivity.

Write today for more details on new Glidden ZOPAQUE-R, the finest name in Rutile Titanium Dioxide.

ZOPAQUE-R33—For latex paints
ZOPAQUE-R66—All-purpose Rutile
ZOPAQUE-R88—Non-chalking Rutile

Another achievement of Glidden Planned Research

QUALITY Glidden PRODUCTS

THE GLIDDEN COMPANY

CHEMICALS • PIGMENTS
METALS DIVISION

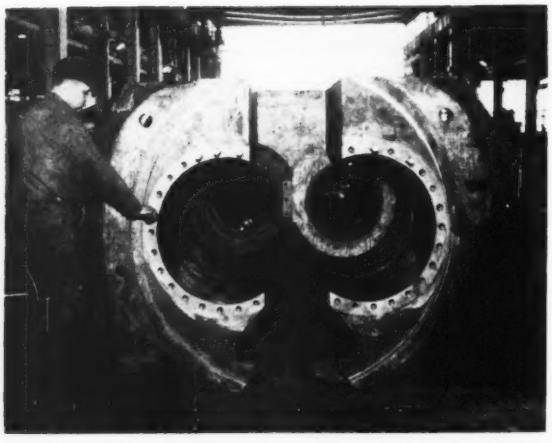
Baltimore, Md. • Collinsville, Ill. • Hammond, Ind.
Oakland, Calif.

*Trade Mark Reg. U. S. Pat. Off.

Now Added Service Features

BANBURY

Assure Still Greater All-Way Savings For

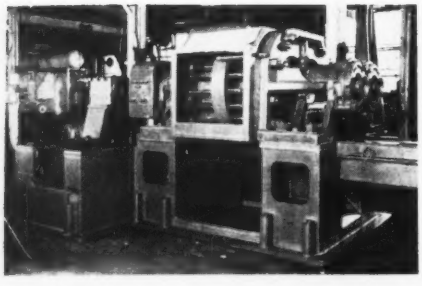


No. 27 side jackets rebuilt by Interstate. Jackets bored out and 2-inch high carbon steel sleeves inserted.

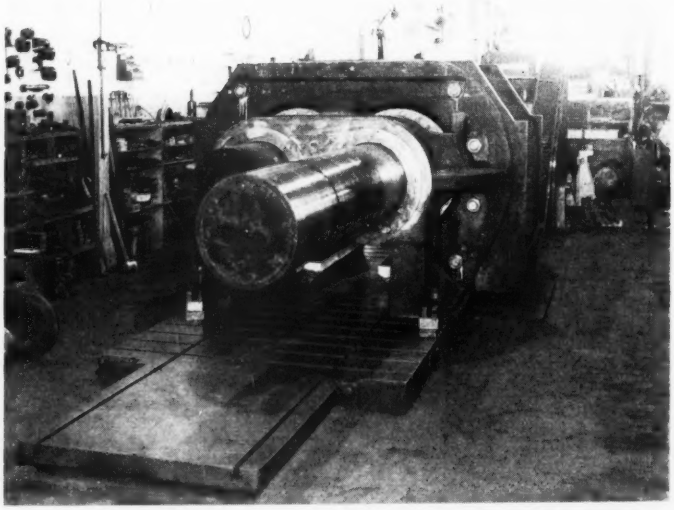
We Invite You To

See Your Rebuilt And Assembled Banbury Body Running Under Power

In Our Plant Before Shipment to You



No. 9 Body and Base fabricated by Interstate.



No. 27 Body rebuilt by Interstate, reassembled and mounted on bed plate in our plant ready for customer to see it running.

To Speed IWS Precision REBUILDING

Interstate Welding Service Customers

WE ANNOUNCE with pride that the fine Plant of the SKINNER ENGINE COMPANY, in Erie, Pa., with its unsurpassed capacity for precision work, is now a great new link in our production facilities. This important advance will expedite the increasing orders from our many customers who recognize that the real bargain in Banbury rebuilding is Quality.

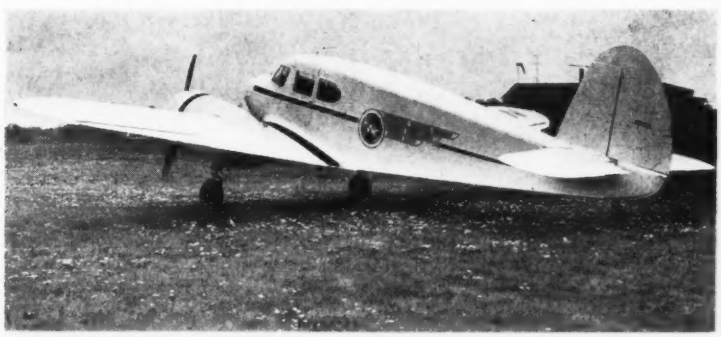
Interstate Banbury Rebuilding Service, perfected through more than seventeen years of practical experience, is now, more than ever, your guarantee that every part of your worn Banbury body will be restored to "good-as-new" efficiency.

Two options are available to you: You can use our "PRE-PLAN" method to have your worn mixer body completely rebuilt and returned to you — or you can INTERCHANGE your mixer body for one of ours, already completely rebuilt.

Either way YOU SAVE valuable weeks of production time. Either way you have a Banbury ready for many more years of good service. Our facilities handle every size Banbury, and we can fabricate any of the parts needed for any size.

It will cost you nothing to have an estimate. One of our engineers will visit your plant and inspect your installation at your request.

SPEEDLINED BANBURY FIRST AID SERVICE



Whenever you have Banbury trouble, just phone or wire us, and an engineer will fly to your plant for first-aid consultation. BUT WHY WAIT FOR A BREAKDOWN? . . . Call us now.

SERVING THE IWS RUBBER INDUSTRY

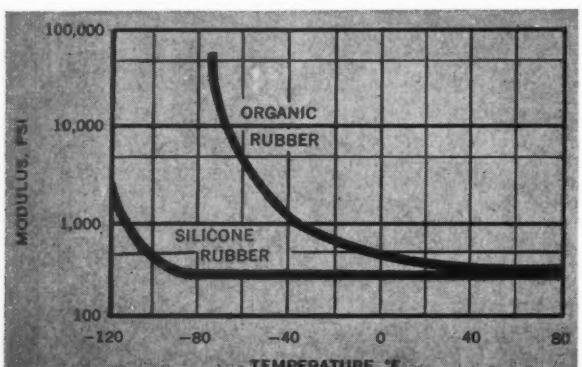
EXCLUSIVE SPECIALISTS IN BANBURY MIXER REBUILDING

INTERSTATE WELDING SERVICE

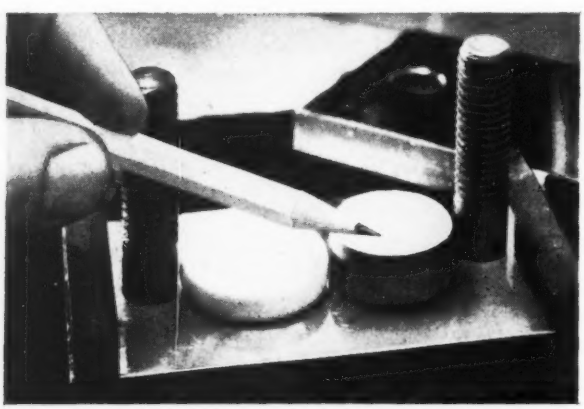
Main Offices — Metropolitan Bldg., AKRON 8, OHIO Phone JE-7970

REMARKABLE SALES
NEW SILICONE
DEMONSTRATED BY TEST...

High temperature resistance: Elevated temperatures have no appreciable effect on the 1000-1200 volts per mil dielectric strength of glass cloth coated with SE-100.



Flexible at −120 F: A glance at the blue curve shows the difference (Young's Modulus in flexure) of SE-550 versus organic rubber after 24 hours.



Compression set test: Ordinary silicone rubber and SE-360 (right) after 22 hrs. at 350F. (ASTM-D 395, method B 30% deflection)

SE-100—IDEAL FOR ELECTRICAL AND MECHANICAL APPLICATIONS!

General Electric's new silicone rubber coating compound, SE-100, combines outstanding heat resistance, electrical and physical properties for a wide variety of electrical and mechanical applications. SE-100 may be coated on glass or organic fabrics for service at high or low temperatures or where resistance to weather, ozone, corona or chemicals is required.

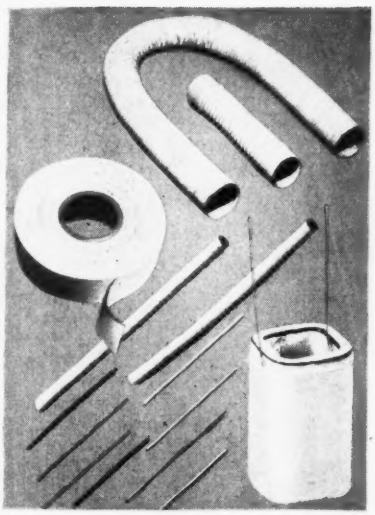
SE-550—STILL FLEXIBLE AFTER 24 HOURS AT —120 F!

G. E.'s new extreme low-temperature silicone rubber, SE-550, combines high strength and elongation with maximum low-temperature usefulness. SE-550 shows practically no increase in modulus at −100 F and retains useful flexibility at −120 F. This flexibility is achieved without sacrifice of high-temperature resistance or any of the other desirable properties inherent in silicone rubber.

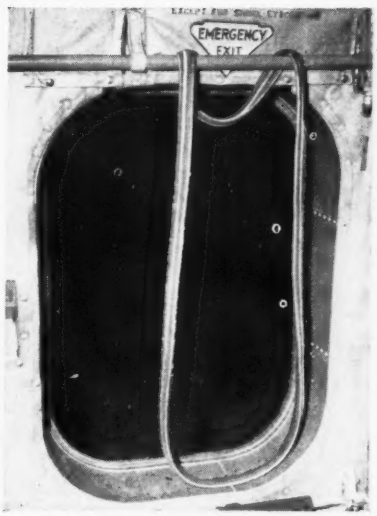
SE-360 —LOWER COMPRESSION SET THAN ANY KNOWN RUBBER!

G. E.'s new low compression set silicone rubber, SE-360, is designed to provide more positive sealing action in parts subject to compression at elevated temperatures. In addition to its outstanding low compression set, SE-360 has unusually low shrinkage when cured. Now you can meet customer requirements for closer tolerances and minimize scrap loss using molds designed for organic rubber.

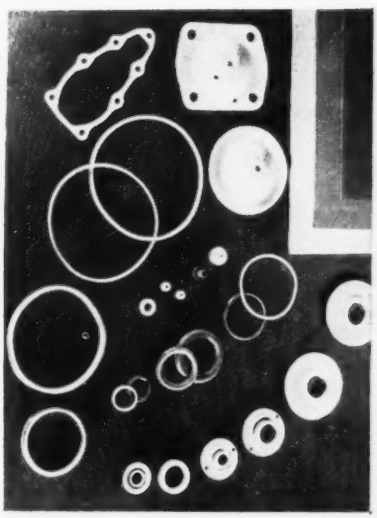
ADVANTAGES OF THREE GREAT
RUBBER COMPOUNDS
CONFIRMED BY APPLICATION



G.E.'s SE-100 silicone rubber is finding steadily increasing application in the electrical industry for coating cloth, tapes and sleeving; for coating glass-served wire; for encapsulating coils. Among the many mechanical uses for SE-100 are ducts and tubing; gaskets and seals; diaphragms.

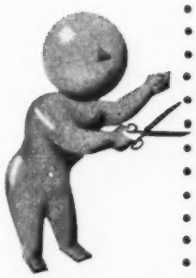


Gaskets for emergency hatches (shown here at 50 below zero F) astra domes and access windows on the Douglas Globemaster are now made of G.E.'s SE-550 silicone rubber because it remains flexible and maintains a seal at extremely low temperatures; does not stick to metal after long inactivity.



O-rings, gaskets and seals are being designed with G.E.'s new SE-360 silicone rubber for applications where sustained resilience at high temperatures is required. Aircraft, automotive and railway design engineers find SE-360 ideal for jet engine parts, transmission seals and Diesel gaskets.

CLIP AND MAIL TODAY!



You can put your confidence in—

GENERAL ELECTRIC

General Electric Company
Section 353-6A
Waterford, New York

Please send me product data on ( ) SE-100 ( ) SE-550 ( ) SE-360. I want this information for ( ) Reference purposes only ( ) An immediate application on_____

_____

Name_____

Firm_____

Street_____

City_____ Zone____ State_____

(In Canada, mail to Canadian General Electric Company, Ltd., Toronto)

ST. JOE Unit-Loads

FOR TRUCK & CARLOAD SHIPMENTS OF

ZINC OXIDE

NOW AVAILABLE AT NO ADDITIONAL COST

THE ST. JOSEPH LEAD COMPANY after several years of experimenting, has developed for its zinc oxide customers a loading method known to the trade as "unit load." This new method has been worked out successfully for both truck and carload shipments with a number of zinc oxide users who have adopted it as a standard practice for their shipments. This service is provided at no additional cost to the customer, and has resulted in a saving of up to 50% of the unloading cost of bag by bag handling. Each unit-load is compressed to about 75% of its original volume, which results in increased storage capacity. Improved material handling, and greater cleanliness are other advantages gained by this method.

OUR 6-PAGE ILLUSTRATED FOLDER, CONTAINING DETAILED OPERATING DATA ON THE ST. JOE UNIT-LOAD METHOD IS YOURS FOR THE ASKING.

ST. JOSEPH LEAD COMPANY
250 Park Avenue, New York 17

Plant & Laboratory:
Monaca (Josephtown) Pennsylvania

Not a leak in a tanker load!

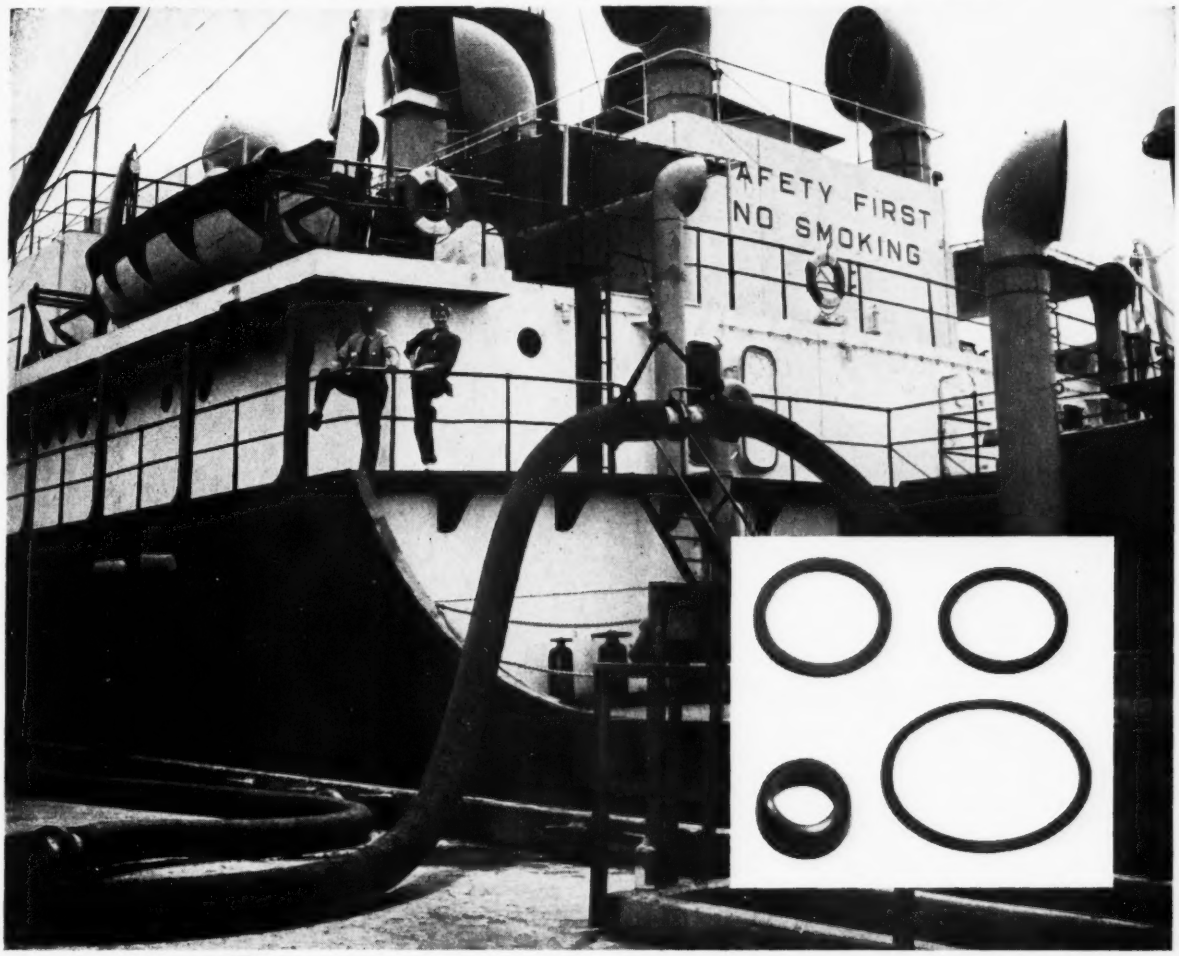


Photo courtesy Esso Standard Oil Co.

Paracril® sees to that!

Oil pump and hose gaskets made of this unique, oil-resistant chemical rubber form perfect oil-proof seals that are outstanding for long, trouble-free service.

Flexible and resilient, they're unharmed by aliphatic hydrocarbons, by mineral, vegetable or animal fats and oils, or by most aromatics.

What's more, Paracril provides excellent resistance to normal and high-temperature aging, high tensile strength, extreme low-temperature flexibility, and great resistance to abrasion.

Keeping oil in its place is but one of many proven Paracril applications. This versatile chemical rubber is ideal for belting, diaphragms, linings, printing blankets, flooring, proofed goods, molded articles—almost wherever a rubberlike material is needed.

Available in three general grades of oil resistance, Paracril is extremely easy to process—readily calendered, extruded, molded, or solvated for cements and adhesives.

It will pay you to investigate the *many* advantages Paracril offers. For further information, simply write on your letterhead to the address below.

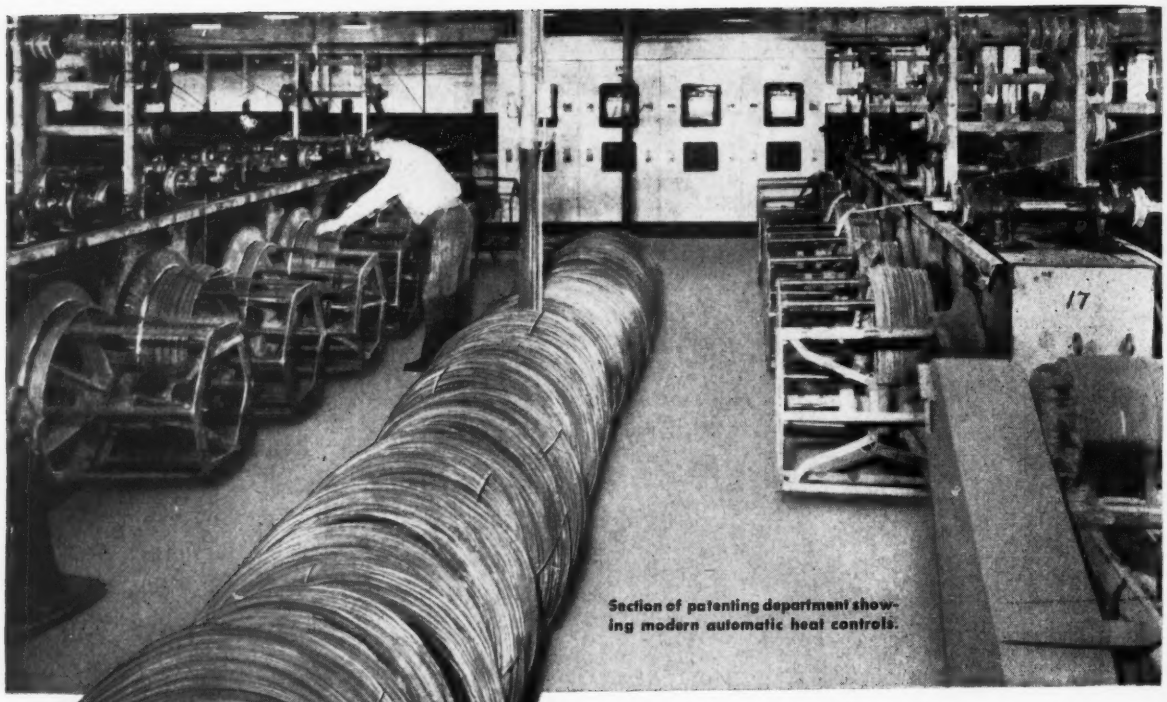
Naugatuck Chemical

138 ELM ST.,
NAUGATUCK, CONNECTICUT

Division of United States Rubber Company

IN CANADA: NAUGATUCK CHEMICALS DIVISION • Dominion Rubber Company, Limited, Elmira, Ontario

Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices



Section of patenting department showing modern automatic heat controls.

wire control

to save you money!

• The accuracy with which your wire specifications are met, *and held,* quite naturally has an important bearing on the cost, speed and quality of your production. That's why you can profit by National-Standard's facilities and exceptional experience in producing fine wire of many metals and alloys for exacting needs.

Here, all phases of wire processing . . . drawing, cleaning, heat treating, plating, finishing . . . are controlled to a degree and accuracy never exceeded, not often equalled. It's a firmly rooted National-Standard policy that can save you time and money.

Remember, too, another National-Standard policy that can work to your advantage—highly qualified engineering service in the development and application of special wire to solve special problems. As always, it's yours for the asking.

NS
NATIONAL-STANDARD Company
NILES, MICHIGAN

DIVISIONS OF NATIONAL-STANDARD CO.

ATHENIA STEEL	*Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD	*Niles, Mich.*	Tire Wire, Stainless, Fabricated Braids and Tape
REYNOLDS WIRE	*Dixon, Illinois*	Industrial Wire Cloth
WAGNER LITHO MACHINERY	*Jersey City, N. J.*	Metal Decorating Equipment
WORCESTER WIRE WORKS	*Worcester, Mass.*	Round and Shaped Steel Wire, Small Sizes

SILICONE EMULSION

HSC-35

A BETTER MOLD RELEASE AGENT *and* LUBRICANT THAT SAVES TIME *and* CUTS PRODUCTION COSTS

- ✔ ON TIRE MOLDS AND CARCASSES
- ✔ IN CURING BAG DIP TANKS
- ✔ ON MOLDS FOR MECHANICAL GOODS
- ✔ ON RUBBER SOLES AND HEELS
- ✔ ON VINYL FLOOR TILES
- ✔ ON HIGH-LOADED THERMOSETTING COMPOUNDS
- ✔ ON SHALLOW-DRAW MOLDS WITH ALL TYPES OF COMPOUNDS

HSC-35 is a 35% oil-in-water emulsion of Silicone Mold Release Oil, developed to assure the most efficient use of the active ingredient . . . As a mold and bag dip lubricant it has proved outstanding as a release agent, keeping molds cleaner and surface-finish of products free from deposit or stains . . . HSC-35 possesses unusual stability to "creaming" and phase separation . . . It is being used with remarkable success on all types of molds for mechanical goods, soles and heels, on mandrels and under extruded lead, on vinyl tile presses, in the treatment of cloth and paper used for polishing and in the treatment of glass fibers to render them water-repellent. Many other successful applications establish the broad versatility, economy and efficiency of HSC-35.

**Write for complete data.*

HARWICK STANDARD CHEMICAL CO.

AKRON, BOSTON, TRENTON, CHICAGO, LOS ANGELES

HIGH QUALITY at LOW COST

for reinforced polyesters

If you're seeking ways to get better polyesters at low cost, let us recommend the right DIAMOND Precipitated Calcium Carbonate for your product.

You'll get smoother surfaces, no cracks, no evidence of glass fibers when DIAMOND Carbonates are mixed with catalyzed, glass-reinforced polyesters. And your product gets improved wet strength and reduced shrinkage.

All these at lower volume cost.

DIAMOND offers these precipitated calcium carbonates for reinforced polyesters:

Surfex® MM—coated with 1% resin; particle size about 5 microns.

Suspenso®—same as Surfex MM, but uncoated.

Kalite®—coated with 1% stearic acid; size about one micron.

Multifex® MM—uncoated; particle size about .06 micron.

Write for DIAMOND technical bulletin: *The Use of Precipitated Calcium Carbonates in Reinforced Plastics.*

DIAMOND SALES OFFICES: New York, Philadelphia, Pittsburgh, Cleveland, Cincinnati, Chicago, St. Louis, Memphis, Houston.

DISTRIBUTORS OF THESE PRODUCTS: C. L. Duncan Co., San Francisco and Los Angeles; Van Waters and Rogers, Inc., Seattle and Portland, U. S. A.; Harrisons & Crosfield (Canada) Ltd.

DIAMOND ALKALI CHEMICALS ®

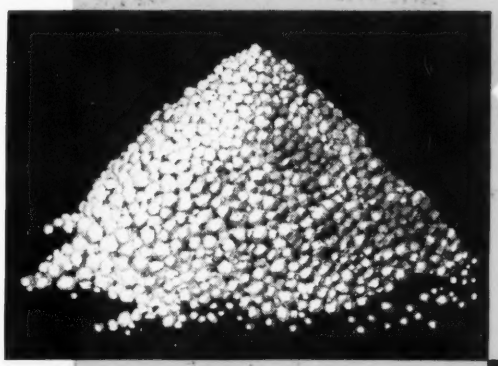
DIAMOND CHEMICALS

FOR THE RUBBER AND PLASTICS INDUSTRIES

DIAMOND ALKALI COMPANY...CLEVELAND 14, OHIO

DOUBLE-CHECKED ✓ CHEMICALS FOR THE RUBBER INDUSTRY . . .

SHARPLES ACCELERATORS FOR LATEX



XTRUDED

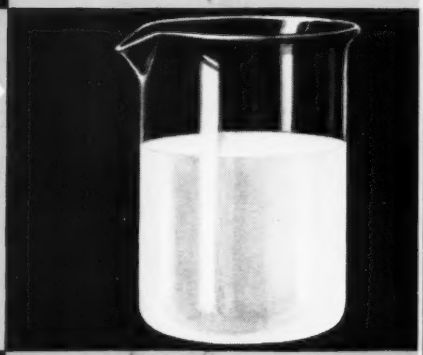
(the 9 series)

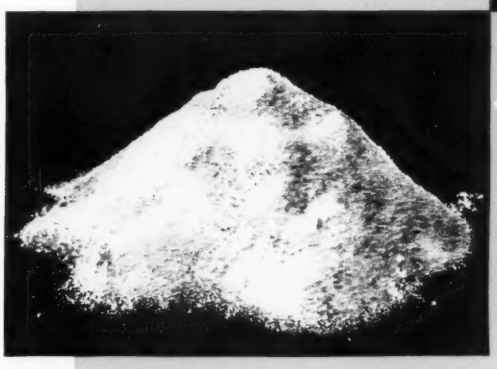
Non-dusting soft pellets for use in making ball and colloid mill dispersions.

DISPERSED

(the 7 series)

A 50% water suspension for addition to latex, in most cases without further treatment.





POWDER

For those who prefer accelerators in powdered form.

SA-57 ZINC DIMETHYLDITHIOCARBAMATE

SA-67 ZINC DIETHYLDITHIOCARBAMATE

SA-77 ZINC DIBUTYLDITHIOCARBAMATE

SHARPLES TRADE MARK CHEMICALS

SHARPLES CHEMICALS INC.

A SUBSIDIARY OF THE PENNSYLVANIA SALT MANUFACTURING COMPANY

500 Fifth Ave., New York • 80 E. Jackson Blvd., Chicago • 106 S. Main St., Akron
Martin, Hoyt & Milne Inc., San Francisco • Los Angeles • Seattle • Portland
Shawinigan Chemicals, Ltd. • Montreal • Toronto
Airco Company International, New York

Build foam-rubber sales with the

UNSEEN SALES POINT

A CLEAN, NEUTRAL ODOR . . .

Foam-rubber upholstery padding has developed a completely new concept of comfort in upholstered furniture—a concept that is finding more and more consumer acceptance every day. But if blowing agents and processing materials have left an unpleasant odor in the rubber, the result is almost always "no sale." That's why many manufacturers are using Du Pont "ALAMASK" odor-masking compounds in their foam-rubber products.

"ALAMASK" completely counteracts the odors frequently retained in the finished product, leaving only a clean, fresh, neutral scent. And the cost of adding this "unseen sales point" to your product is practically negligible, since such a small quantity of "ALAMASK" is required in each batch, and no special equipment is necessary for its application.

In treating rubber of any type, "ALAMASK" compounds offer many processing advantages. They will not break down in blowing, curing, or mixing systems, or at high temperatures.

One of the "ALAMASK" odor-masking compounds is designed to suit your needs. For more information—or for technical-service helps on any "ALAMASK" application—write E. I. du Pont de Nemours & Co. (Inc.), Aromatics Section, Wilmington 98, Delaware.

Du Pont **Alamask** Odor-Masking Compounds

REG. U. S. PAT. OFF.

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

PRODUCTION control

From beginning to end of the manufacturing process, Pelletex SRF carbon black is under strict, rigid, scientific control. Automatically controlled instruments throughout the plant indicate, control or record every step of the production process from gas to black. Skilled engineers are thus enabled to check or change rates of flow, temperature, pressure and other operating conditions to meet the specifications requisite to production of Pelletex . . . the world's best quality SRF.

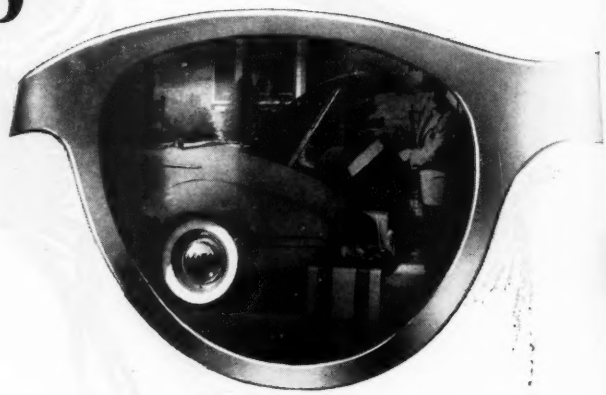
GENERAL ATLAS DIVISION
of Cabot Carbon Company

GODFREY L. CABOT, INC.
77 Franklin St., Boston 10, Mass.

CABOT

PELLETEX

Titanox-for GOOD LOOKS in WHITE WALLS



White sidewalls pigmented with Titanox titanium dioxide pigments are the cleanest, brightest white you've ever seen and they stay that way. Titanox pigments can contribute more to white sidewalls than just good looks. Indications are that Titanox "non-chalking" rutile pigments—especially TITANOX-RA-NC—fortify white walls against crazing, chalking and checking... help maintain the even, brilliant original white of new tires.

Physically and chemically stable, Titanox titanium dioxide pigments are compatible with natural and synthetic rubbers, as well as compounding ingredients. Our Technical Service Department is ready at any time to help you choose the best Titanox pigments for your rubber formulations. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

1158

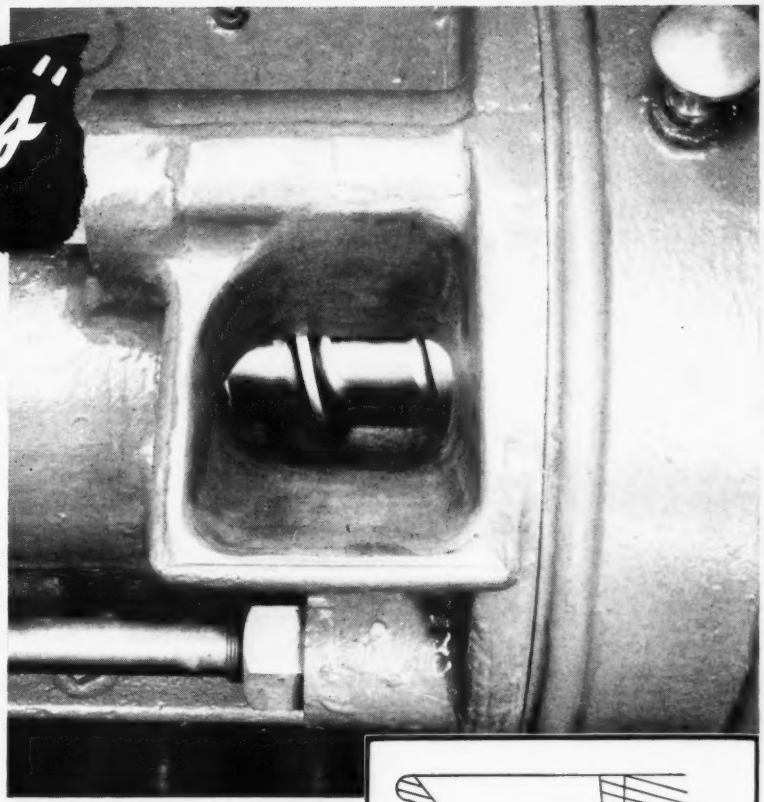
® TITANOX

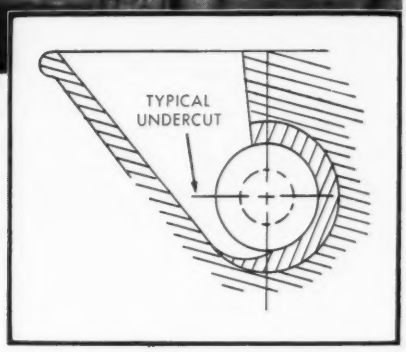
the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

"Feed Boxes" ARE CUSTOM-BUILT ON NRM RUBBER EXTRUDERS





You are looking into the feed box of an NRM 3½" Rubber Extruder. The machine itself is a standard model, for mechanical rubber goods production. But the feed box is *custom-built* to handle the range of rubber compounds used by the particular customer, and to coordinate the Extruder's work perfectly with that of other equipment in his plant. The feed box has an undercut at its terminus, the dimensions and contours of which are specially designed for continuous, uniform self-feeding *without* the help of mechanical "stuffers" or "rollers."

For 25 years, in big and little rubber processing plants, here and abroad, NRM machinery has consistantly proved the superiority of its design and manufacture. And the rubber industry knows, too, that "feed boxes" are only typical of the custom constructing, fitting and adjusting that makes every NRM mesh smoothly into a rubber production setup and stimulate "flow" in that plant.

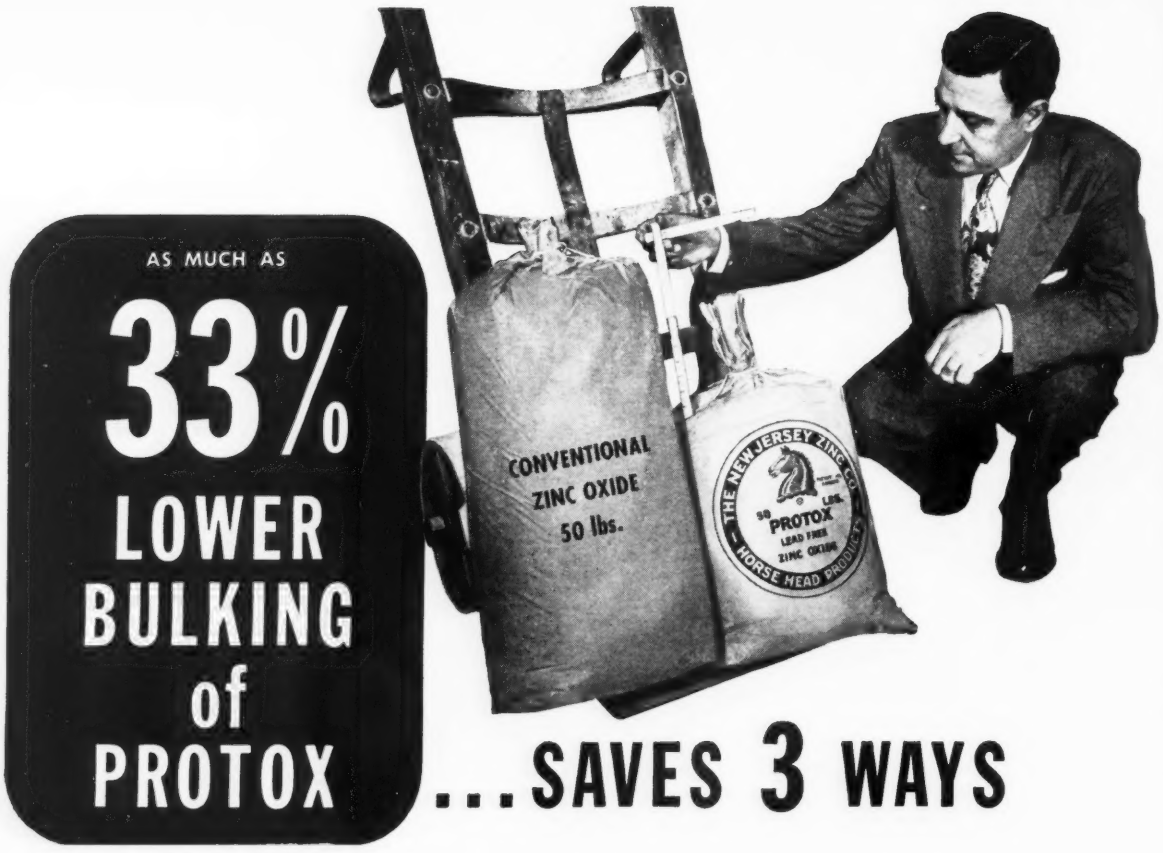
U72

NATIONAL RUBBER MACHINERY COMPANY

Our 25th ANNIVERSARY 1928-1953

Creative Engineering

General Offices & Engineering Laboratories: Akron 8, Ohio
East: 384 Getty Ave., Clifton, N. J.
West: S. M. Kipp, Box 441, Pasadena 18, Cal.
Export: Gillespie & Company, 96 Wall St., New York 5, N. Y.



...SAVES 3 WAYS

This lower bulking of PROTOX* ZINC OXIDES, stemming from their unique coating of zinc propionate, gives you triple advantages:

1. RELEASES VALUABLE STORAGE SPACE

You can carry larger stocks of raw materials to protect your production schedules.

2. CUTS HANDLING COSTS

Reduces number of load trips within your plant.

Carloads of PROTOX ZINC OXIDES are available in unit loads for convenient handling by fork lift-truck in your plant.

3. INCREASES BANBURY CAPACITY

You can mix larger batches.

PROTOX ZINC OXIDES incorporate and disperse rapidly.

PROTOX ZINC OXIDES speed mixing of carbon blacks.

If you are not already using PROTOX ZINC OXIDES, may we furnish you samples?

U.S. Patents 2,303,329 and 2,303,330

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

... most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

HORSE HEAD PRODUCTS

SHELL DUTREX®

AN ECONOMICAL GROUP OF PLASTICIZERS AND EXTENDERS FOR RUBBER AND PLASTICS

SHELL

SHELL OIL COMPANY

50 WEST 50th STREET, NEW YORK 20, NEW YORK

100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

Once is not enough!

The need for blood is greater than ever, not only for men wounded in combat, but here at home . . . to cure disease, to meet accidents and disasters, and to prepare for civil defense.

Our quota can ONLY be met, if those who give *keep on* giving . . . regularly!

You CAN give more than once . . . as often as every three months with complete personal safety. The more often you give the more often you save a life. For every pint of blood you give goes to someone who needs it desperately.

Remember . . . once is NOT enough. Give blood again and again! Call your Red Cross, Armed Forces or Community Blood Donor Center for an appointment to give blood today.

GIVE BLOOD

...give it again and again

BUSINESS EXECUTIVES!

CHECK THESE QUESTIONS

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ◯ HAVE YOU GIVEN YOUR EMPLOYEES TIME OFF TO MAKE BLOOD DONATIONS?
- ◯ HAS YOUR COMPANY GIVEN ANY RECOGNITION TO DONORS?
- ◯ DO YOU HAVE A BLOOD DONOR HONOR ROLL IN YOUR COMPANY?
- ◯ HAVE YOU ARRANGED TO HAVE A BLOOD-MOBILE MAKE REGULAR VISITS?
- ◯ HAS YOUR MANAGEMENT ENDORSED THE LOCAL BLOOD DONOR PROGRAM?
- ◯ HAVE YOU INFORMED EMPLOYEES OF YOUR COMPANY'S PLAN OF CO-OPERATION?
- ◯ WAS THIS INFORMATION GIVEN THROUGH PLAN BULLETIN OR HOUSE MAGAZINE?
- ◯ HAVE YOU CONDUCTED A DONOR PLEDGE CAMPAIGN IN YOUR COMPANY?
- ◯ HAVE YOU SET UP A LIST OF VOLUNTEERS SO THAT EFFICIENT PLANS CAN BE MADE FOR SCHEDULING DONORS?

Remember, as long as a **single** pint of blood may mean the difference between life and death for **any** American . . . the need for blood is **urgent!**

NATIONAL BLOOD PROGRAM

SLIPPERY UNCURED RUBBER?

Yes— WHEN IT'S DIPPED, SPRAYED OR BRUSHED WITH

GLYCERIZED
(LIQUID CONCENTRATE)
LUBRICANT

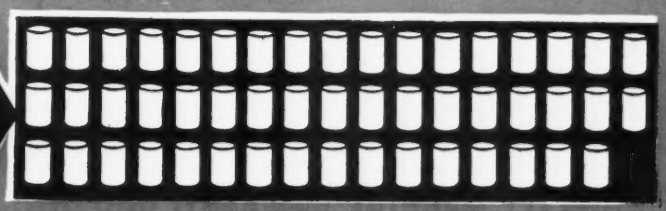
THE ALL PURPOSE RUBBER LUBRICANT FOR

NATURAL SYNTHETIC AND RECLAIM STOCKS

Prevents adhesion of hot rubber slabs when piled . . . banishes dust nuisance by replacing soapstone or talc . . . prevents sticking during cure of extrusions and flat pan coiled tubing . . . excellent release agent for molds, mandrels, air bags, belt drums . . . equally satisfactory for washing and finishing inner tubes; imparts satiny finish . . . greatly aids in the processing of insulated wire and cable. The Production Departments and Laboratories of many rubber manufacturers, through years of using GLYCERIZED, give ample proof of its outstanding qualities as a lubricant for natural, synthetic and reclaimed stocks.

Economical? HERE'S WHY

HIGHLY CONCENTRATED
1 drum makes up to 50 drums of working solution.



Also Mfgrs. of

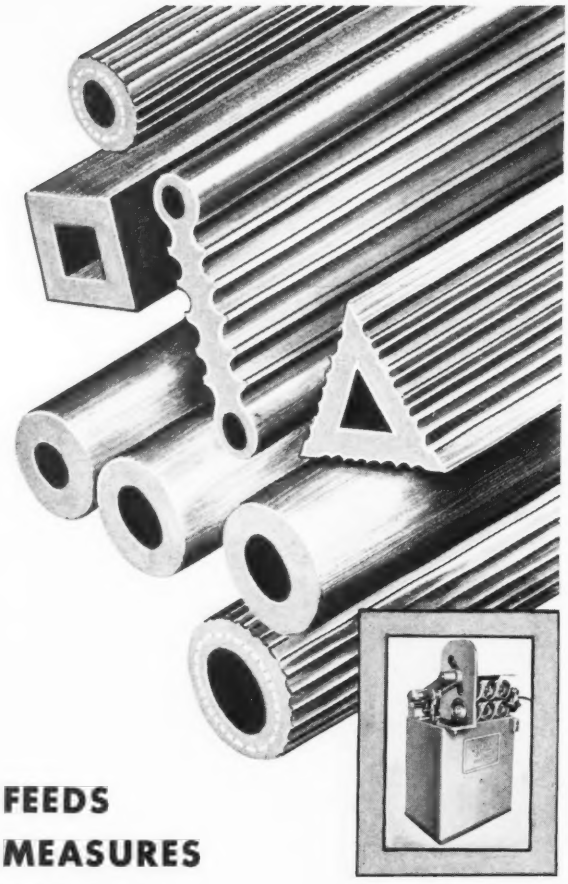
RUBBEROL AND **SYNTHOL** TWO OTHER FACTORY PROVED RUBBER PROCESSING AGENTS

QUALITY SINCE 1884

GENSEKE BROTHERS

RUBBER MATERIALS DIVISION

West 18th Place and Whipple Street Chicago 32, U.S.A.



FEEDS
MEASURES
COUNTS
CUTS—AUTOMATICALLY

The new Fidelity Measuring and Cutting Machine feeds, measures, counts and cuts products of rubber, synthetic, or natural fiber construction automatically to any desired length. Designed to hold closest tolerances. Change length or diameter in a matter of seconds. Safe—fast—reduces labor costs and material waste.

Catalog H gives full details. Write today or if you'd like to see this machine in operation—visit the new show rooms at our plant:

Designers and Builders of Intricate, Automatic Precision Machines

FIDELITY MACHINE COMPANY, INC.

SINCE 1911

3908-18 FRANKFORD AVENUE, PHILADELPHIA, PA.

Canadian Representative:
W. J. Westaway Co., Ltd., Hamilton, Ontario, Canada *Export Dept.*, 25 Beaver Street, New York 4, N. Y.

The Institution of the Rubber Industry

LONDON

THE RUBBER INDUSTRY owes its development largely to scientific and technical research and the Institution was founded in 1921 to foster scientific and technical advancement and to disseminate the results.

THE INSTITUTION TODAY is the centre of a great fraternity of rubber manufacturers, scientists, technologists, research establishments, executives and students from every country whose object is the advancement of the cause of the rubber industry throughout the world.

OBJECTS: To promote corporate and concerted effort in the industry by bringing together all those engaged or interested in the various branches of science and technology on which the Industry is based and co-ordinating their respective contributions.

To promote the profession and practice of Rubber Technology.

To encourage the extension of scientific and technical education in the principles and details of rubber manufacture.

To maintain a scheme of Diplomas for the recognition of efficiency in knowledge of all branches of technology essential to the successful maintenance and development of rubber manufacture.

To arrange for the holding of meetings, the reading of papers and the giving of lectures with subsequent discussions and publication.

To foster the systematic study of scientific and technical problems involved in the various phases of the manufacture of natural and synthetic rubbers and rubber-like materials and their conversion into finished products.

To encourage original work and research dealing with the manufacture of rubbers.

PUBLICATIONS.

The Transactions: Bi-monthly record of scientific and technological investigations in the realm of rubber and its allied industries.

Annual Report on the Progress of Rubber Technology: containing systematic accounts of the developments in rubber technology from year to year.

Proceedings of Rubber Technology Conferences.

INVITATION TO MEMBERSHIP.

At this time of progress and expansion in the affairs of the Institution, its Council, conscious of the benefits that lie within the sphere of the Institution, invites applications for the privilege of membership from those engaged or interested in the Rubber and its allied industries.

Application forms and full particulars may be obtained from:—

THE REGISTRAR
INSTITUTION OF THE RUBBER INDUSTRY
12, WHITEHALL
LONDON, S.W. 1, ENGLAND

AND NOW

Cabol 100

CABOT'S NEW Hydrocarbon Oil Plasticizer for Low Cost Vinyl Compounding

- Pound Volume Cost in the Range of Low Cost Inert Fillers
- Plasticizer Efficiency of 1.5 as Compared with DOP Efficiency of 1.0
- Up to 50% Compatibility with Octyl-Phthalate Type Plasticizers

Available for Immediate Delivery in Commercial Quantities

Investigate the use of **CABOL 100** in your plastics products

- *For samples and further technical information address*

Cabot produces "Cabol 100" used in floor tiles, but does not make the finished product

Plasticizer Division

GODFREY L. CABOT, INC.

77 FRANKLIN ST., BOSTON 10, MASS.

CABOT

Cuts up to... 36,000 ...pieces per hour

The

HOLMES

ROTARY STOCK CUTTER

FOR HIGH SPEED, LOW COST CUTTING OF EXTRUDED STOCK --PREPARATORY FOR MOLDING

Saves--Time...Labor...Material

In your plant--The HOLMES ROTARY STOCK CUTTER--will certainly minimize operating time...reduce high labor cost...and...save expensive material. Adjustable to handle stock up to 3" in diameter...cut pieces up to 3" in length...and...will cut up to 36,000 pieces an hour. Low initial cost--will quickly pay for itself.

WRITE OR WIRE FOR SPECIFIC DETAILS--regardless of your particular requirements. With 52 years know-how specializing in machinery and molds for the rubber industry--Holmes can help you solve your problems, too, just as they have for so many others. No obligation, of course.

SEND FOR ILLUSTRATED FOLDER...TODAY

Stanley H. HOLMES Company

Successor to Holmes Brothers, Inc.

440 N. Sacramento Blvd., Chicago 12, Ill.

Rubber

- CRUDE RUBBER—member Rubber Trade Association of New York handling all types of Rubber.
- FACTORY SCRAP—Bought & Sold—uncured compounds, scorched stocks, friction scrap, everything.
- HARD RUBBER DUST—all qualities to your specifications.
- SCRAP RUBBER—All Types—sorted, packed and shipped with rigid observance to prevailing specifications.

Plastics

- NEED POLYETHYLENE PELLETS? NEED POLYSTYRENE PELLETS? Call us for them. Reprocessed to your requirements in our own plant.
- We will buy or sell your Polyethylene, Polystyrene, Vinyl, and Acetate scrap or surplus.
- Write for information sheet "How to identify types and grades of plastic scrap".

BEST IN VALUE AND SERVICE

George Woloch co., inc.

82 Beaver Street
New York 5, N.Y.
Phone: HAnover 2-1171

Cable Address: GEOWOLOCH, N.Y.

AKRON, Ohio—1082 Norita St.
Phone: SWandale 4-5237

NEEDHAM, Mass.—102 Oak St.
Phone: NEedham 3-2853

Improve Product Quality

WITH NEVILLE

COUMARONE RESINS

To save in manufacturing costs and at the same time improve product quality, you'll most certainly want to use Neville Resins. For these resins are products of years of research and "know-how" in helping solve rubber production problems.

Neville Coumarone Resins are extender-plasticizers, which will not tend to lower hardness, tensile, modulus or tear. They come in various grades of melting points and colors.

We can help you select the grade best suited to your purpose.

THE NEVILLE COMPANY • PITTSBURGH 25, PA.

Plants at Neville Island, Pa., and Anaheim, Cal.

Grandfather had a hard life . . .

Cycle tyres stuffed with horsehair and cobbled streets must have made life a bit uncomfortable for Grandfather. Since the introduction of pneumatic tyres, we have kept full abreast of every development and today we are the leading manufacturers of cycle tyre producing equipment in the World.

Shaw-McNeil 40-34-33/4 Twin Bag-o-matic Curing Press for Cycle Tyres. Supplied complete with motor and controller, time cycle controller — ready for connection to service lines.

SHAW

machinery for tyre and tube production

FRANCIS SHAW AND COMPANY LIMITED MANCHESTER 11 ENGLAND

TELEPHONE: EAST 1415/8 TELEGRAMS: CALENDER, MANCHESTER

LONDON OFFICE: 34 VICTORIA STREET LONDON SWI PHONE: ABBEY 1800 GRAMS: VIBRATE PHONE LONDON

P2854

Trade Mark

HEVEATEX
CORPORATION
78 GOODYEAR AVENUE
MELROSE 76, MASS.

BRANCHES: CHICAGO, ILL. AKRON, O. DETROIT, MICH. LOS ANGELES, CAL.

Natural and Synthetic

Latex and Latex Compounds

for all purposes

DRY IT!

POUR IT!

RECLAIM IT!

REINFORCE IT!

WITH SILENE

Most rubber compounders think of Silene primarily as an excellent and economical rubber reinforcing pigment for soling . . . wringer rolls . . . drug sundries . . . mechanical and molded goods.

But the properties of Silene make it versatile for many other uses, too, that should not be overlooked.

The fine particle size of Silene gives it unusual surface area and absorptive powers. This makes Silene extremely effective for the following purposes:

DRYING UP a sticky or gummy reclaim stock to workable consistency.

CHANGING liquid or gummy accelerators into dry powders.

INCREASING flowability of certain dry ingredients in storage.

REINFORCING natural and synthetic rubber compounds, giving them white or light color, plus a high level of physical properties.

Silene—a finely divided precipitated calcium silicate—is a companion to Columbia-Southern's two other white pigments . . . Calcene and Hi-Sil.

If you think Silene may help you, we will be glad to supply you with experimental working samples and technical assistance if you wish.

COLUMBIA-SOUTHERN

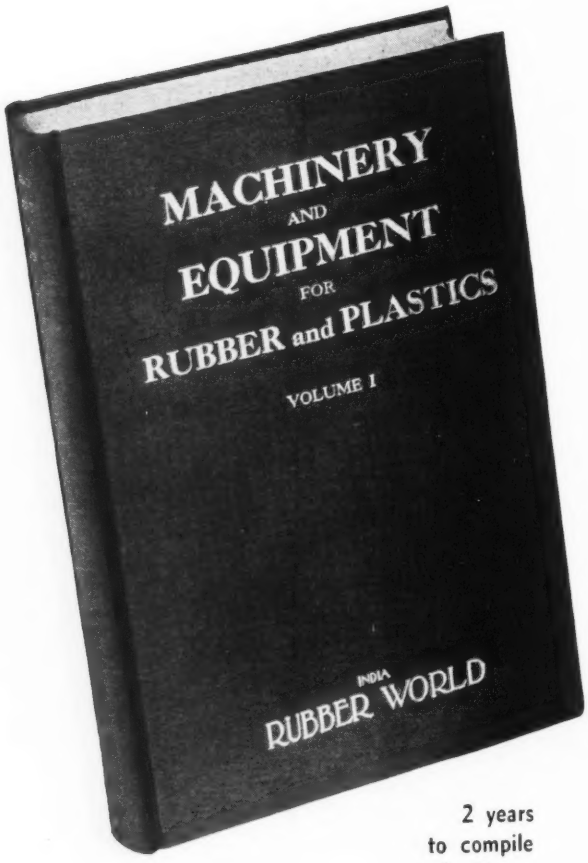
COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

420 FORT DUQUESNE BOULEVARD, PITTSBURGH 22, PA.

DISTRICT OFFICES: BOSTON • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • HOUSTON
MINNEAPOLIS • NEW ORLEANS • NEW YORK • PHILADELPHIA • PITTSBURGH • ST. LOUIS • SAN FRANCISCO

The only book of



2 years
to compile
and edit —

EDITORIAL
Advisory Board

•

GEORGE BRUGGEMEIER
Engineering department,
Firestone Tire & Rubber Co., Akron, O.

H. E. COOK
Chief engineer,
B. F. Goodrich Co., Akron, O.

NORMAN J. ELDER
Manager, calender division,
Adamson United Co., Akron, O.

H. A. FLANNERY
Manager, engineering department,
Goodyear Tire & Rubber Co., Akron, O.

A. L. HESTON
Vice president,
National Rubber Machinery Co., Akron, O.

ROBERT IREDELL
Director of engineering,
General Tire & Rubber Co., Akron, O.

A. G. KESSLER
Vice president,
Farrel-Birmingham Co., Inc., Ansonia, Conn.

A. S. MICHELSON
Vice president,
McNeil Machine & Engineering Co., Akron, O.

F. E. WORLEY
Assistant director of engineering,
United States Rubber Co., New York, N.Y.

This time and money-saving book was compiled by Robert G. Seaman and Arthur M. Merrill, editors of India RUBBER WORLD, a publication with a background of 64 years of close contact with the men who have invented, improved, built, sold and used rubber machinery and equipment since 1889.

The urgent need and value of this 804 page book will be self-evident to all engineering, processing, purchasing and management personnel, especially to those men who have been confronted in the past with the problem of gathering this frequently needed and vital information from varied and widely-scattered sources.

Hundreds of orders have already been received from individuals, firms, libraries and schools — in U.S.A. and abroad. The edition being very limited prompt action is suggested. No reprint is anticipated.

its kind • EDITION LIMITED

Source, Construction and Use of

"MACHINERY AND EQUIPMENT FOR RUBBER AND PLASTICS"

•

Table of Contents

Chapter 1. Mills
Chapter 2. Mill Accessories
Chapter 3. Mixers
Chapter 4. Calenders & Accessories
Chapter 5. Extruders
Chapter 6. Extruder Accessories
Chapter 7. Presses, Compression
Chapter 8. Press Accessories
Chapter 9. Presses, Injection
Chapter 10. Molds & Mold Accessories
Chapter 11. Web Coating & Handling Equipment
Chapter 12. Pressure Vessels
Chapter 13. Heaters, Dryers and Coolers
Chapter 14. Tire & Tube Machinery
Chapter 15. Hose & Belting Machinery
Chapter 16. Footwear Machinery
Chapter 17. Wire & Cable Machinery
Chapter 18. Sole & Heel Machinery
Chapter 19. Latex Machinery
Chapter 20. Special Plastics Machinery

•

804 Pages; 341 Illustrations; Cloth Bound; 6 x 9 inches

Orders Accepted Subject to Prior Sale—no reprint is anticipated

PLEASE FILL IN AND MAIL WITH REMITTANCE OR WE WILL BILL YOU

India RUBBER WORLD
386 Fourth Avenue
New York 16, N. Y.

Date .....

Enclosed find $..... for which send postpaid ..... copies of "Machinery and Equipment for Rubber and Plastics."

Name .....
Firm .....
Street .....
City ..... State .....

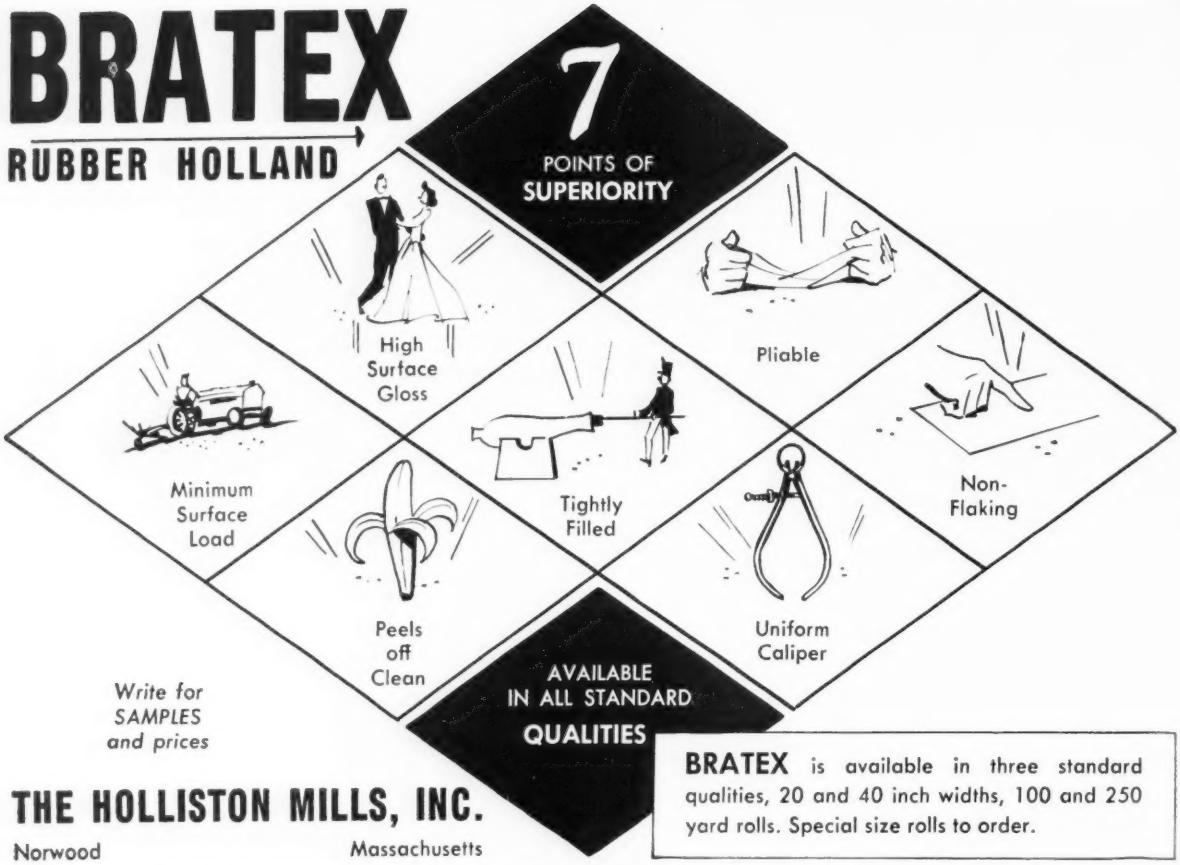
A BILL BROTHERS PUBLICATION

$15.00 Postpaid in U.S.A.; $16.00 Elsewhere. Order direct or through your book dealer.

(Money refunded if returned within 10 days—for any reason.)

BRATEX
RUBBER HOLLAND

7 POINTS OF SUPERIORITY



AVAILABLE IN ALL STANDARD QUALITIES

Write for SAMPLES and prices

THE HOLLISTON MILLS, INC.

Norwood Massachusetts

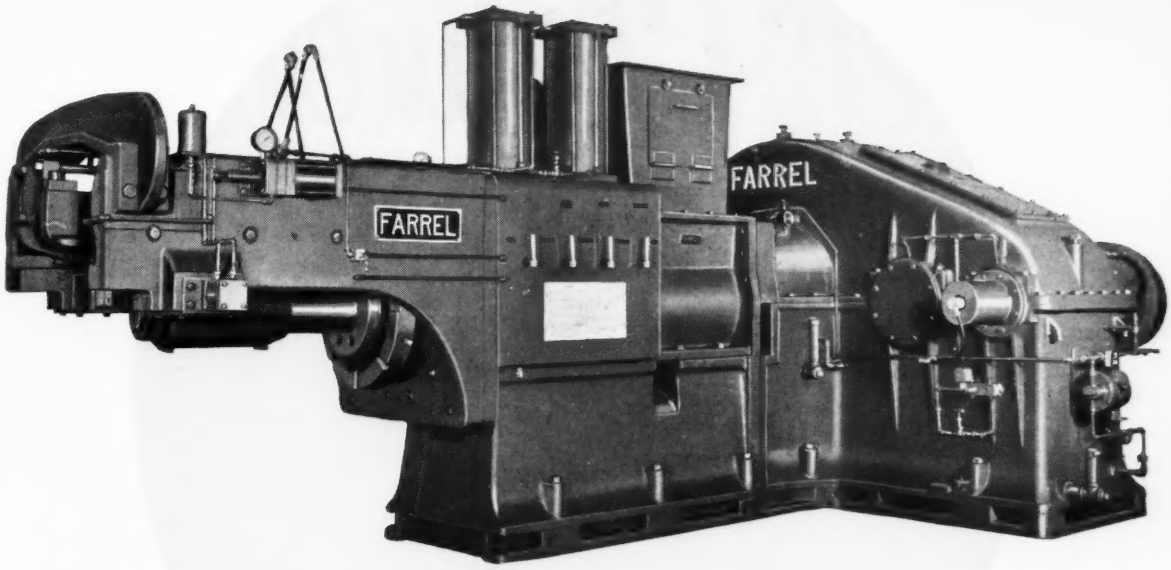
BRATEX is available in three standard qualities, 20 and 40 inch widths, 100 and 250 yard rolls. Special size rolls to order.

• CRUDE RUBBER
• LIQUID LATEX
• CHEMICALS

E. P. LAMBERT CO.

FIRST NATIONAL TOWER
AKRON 8, OHIO
HEmlock 2188
MEMBER — COMMODITY EXCHANGE, Inc.

Neville Resins — Reclaiming Oils — Plasticizers
Latex Compounds — Color Pigments
Powdered Rubber



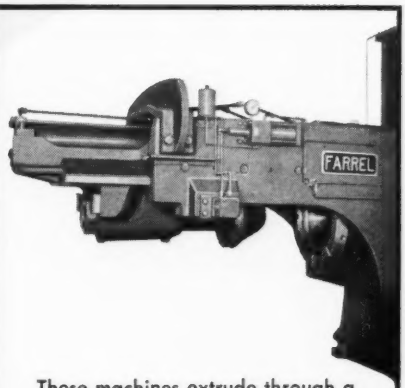
This NEW Giant Extruder can take the output of two size 11 Banbury* Mixers

This new extruder can be used with one size 11 Banbury mixer on short-cycle operation of 1½ to 2½ minutes, or with two size 11's for longer cycles. The extruder is installed under the Banbury, and in the case of two mixers, a belt conveyor carries the discharge from the second mixer to the extruder hopper, alternating with the gravity feed from the first mixer. With this arrangement, production can be maintained at a rate of 10,000 to 18,000 pounds per hour. Operation is entirely automatic.

An electric eye in the feed hopper actuates an air-operated clutch in the drive to stop the machine when the hopper becomes empty between batches. This keeps the screw always full of stock, so that the slab discharged is uniform and unbroken.

Extruders of this size provide the answer to full utilization of short-cycle operation of large-capacity Banbury mixers. The bottleneck of a group of milling operations following Banbury processing is eliminated, together with all manual handling connected with milling. Flow of material is accelerated and simplified; also the plasticity of stock worked by the screw in a single pass in the extruder chamber is more uniform than that of milled stock.

Where the desired rate of production warrants an installation of this size, Farrel-Birmingham's long experience in the design and manufacture of extruding machines takes the risk out of the investment. Write for complete details.



These machines extrude through a circular die. The stock is slit at the die exit to form a continuous slab, approximately 50 inches in width, which can be cut to desired lengths.

A retractable cone, operated by an air-hydraulic system, facilitates rapid automatic cleanout (see above photo). A hydraulically operated locking device keeps the cone in positive operating position. Gauging blocks of different thicknesses, which are mounted on the carriage, are used to adjust the die opening.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT
Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

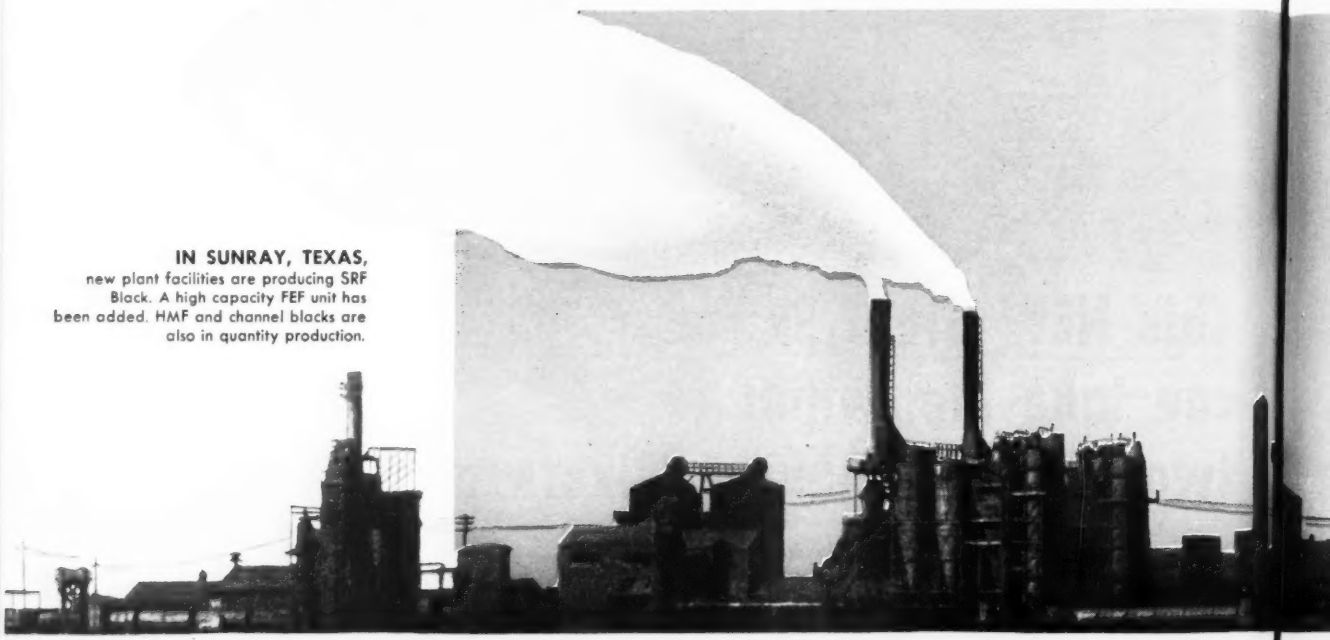
FB-847

Farrel-Birmingham®

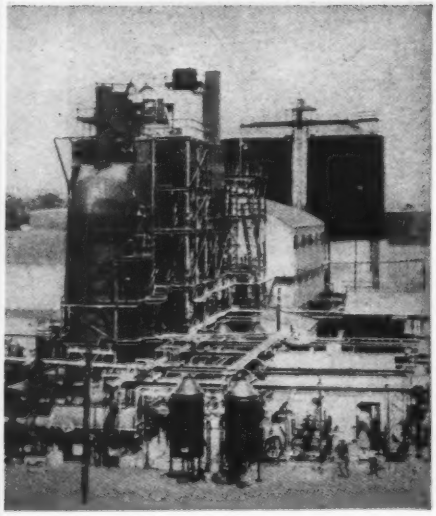
*Trade-mark

Witco-Continental

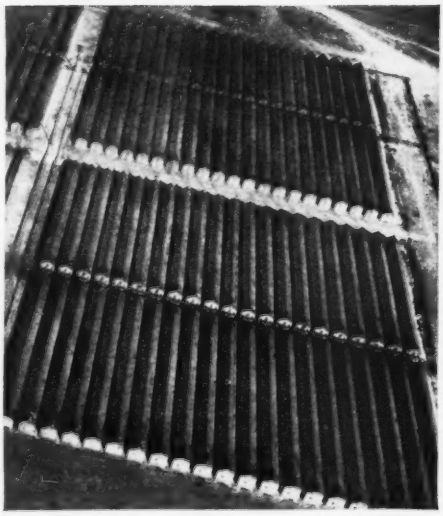
A DEPENDABLE SOURCE O



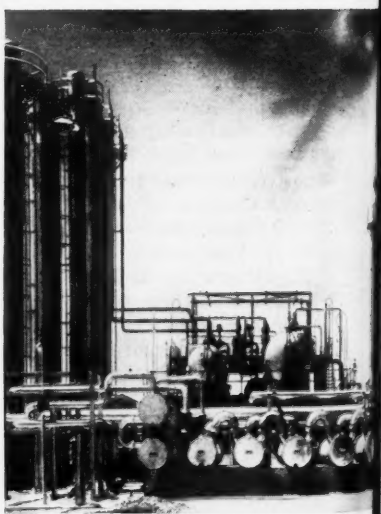
IN SUNRAY, TEXAS, new plant facilities are producing SRF Black. A high capacity FEF unit has been added. HMF and channel blacks are also in quantity production.



IN WESTLAKE, LA., Witco-Continental's new plant has expanded its production of HAF Black.



IN EUNICE, N. M., hundreds of acres of channel black burner houses produce a complete range of channel blacks.



AT BIG LAKE, TEXAS, Witco's natural ga plant produces channel blacks from residual ga

WITCO CHEMICAL COMPANY

CONTINENTAL CARBON COMPANY

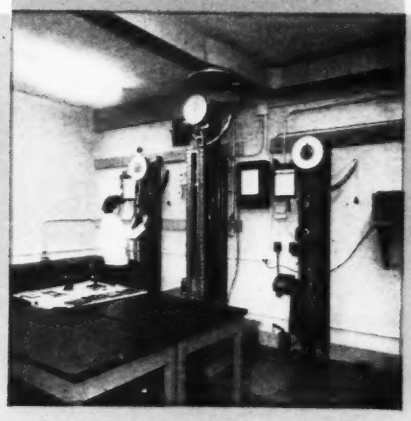
260 MADISON AVENUE, NEW YORK 16, N. Y.

AKRON • AMARILLO • LOS ANGELES • BOSTON • CHICAGO • HOUSTON
CLEVELAND • SAN FRANCISCO • LONDON AND MANCHESTER, ENGLAND

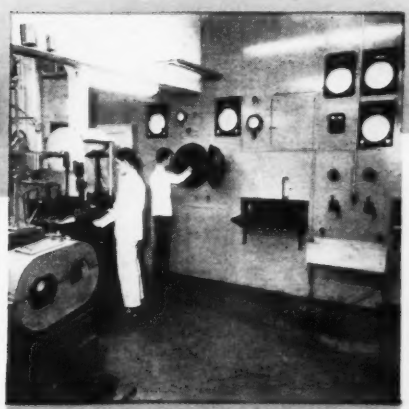
CE OF SUPPLY

backed by the most modern research and technical service facilities . . .

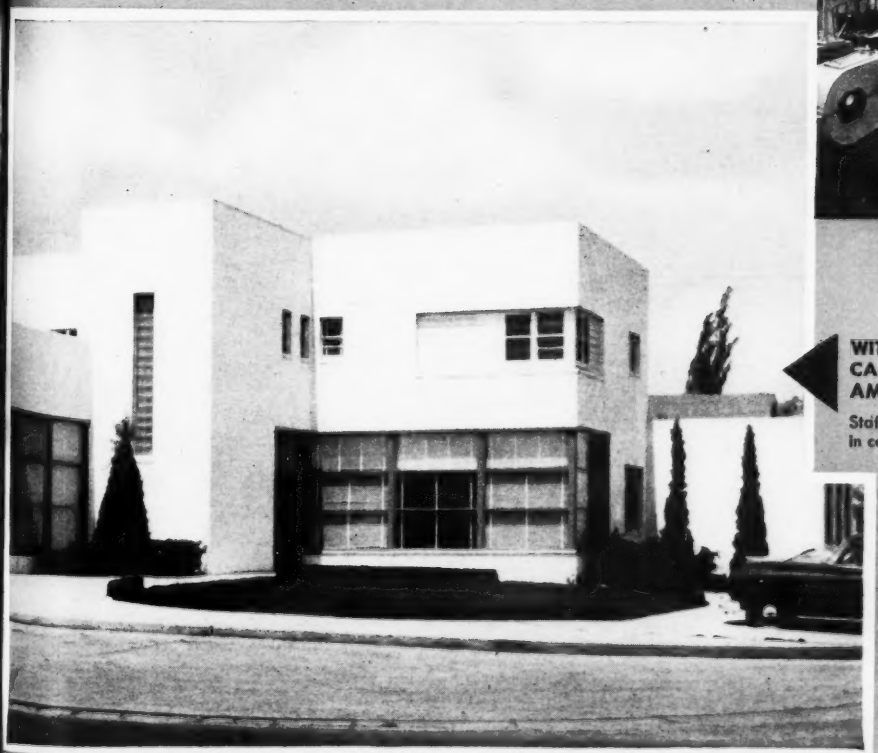
Sectional view of mill room showing compounding of rubber test batches.



Scott Testers for evaluation of rubber compounds; center machine for elevated temperature tests.



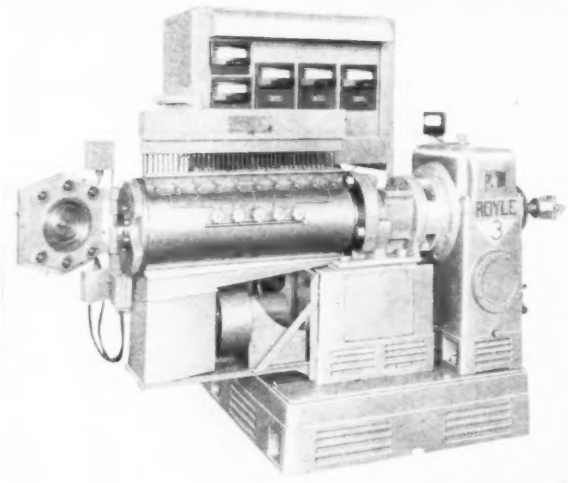
Sectional view of laboratory mill room showing rubber mills, open steam vulcanizer, curing presses.



WITCO-CONTINENTAL CARBON BLACK LABORATORY, AMARILLO, TEXAS.

Staffed by experts, whose long experience in carbon blacks is at your service.

FASTEST HEATING FASTEST COOLING



Here are some of the time-tested, money-saving reasons more and more plants are standardizing with Royle Spirod* Extruders for processes requiring maximum flexibility in controlled temperatures — constantly maintained and accurately zoned:

- **Extra heavy walled cast steel cylinders that will not warp. No joints to leak when pressures are high or crevices to collect burned compound that would cause contamination.**
- **Heavy duty large diameter heating elements, that can be used with 440 volts without step-down transformers, provide radiant heat to cylinders and heads.**
- **Any heating element may be removed and replaced without disturbing other elements or wiring.**
- **A cooling system with ten times the capacity of conventional designs can be modulated through its entire temperature range without drastic changes. Ample cooling for all compounds at maximum speeds.**

No. 3 Royle Spirod Extruder. Completely insulated and equipped for evaporative cooling.

*Patent Applied For

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

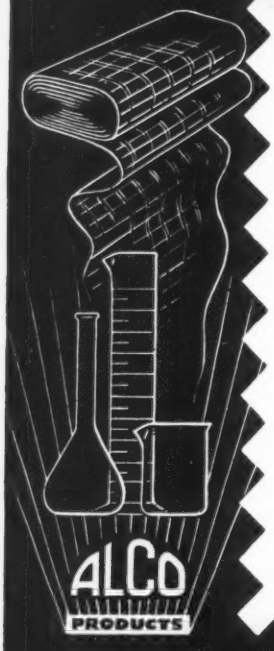
London, England
James Day (Machinery) Ltd.
REgent 2430

Home Office
V. M. Hovey J. W. VanRiper
SHerwood 2-8262

Akron, Ohio
J. C. Clinefelter
SWandale 4-5020

Los Angeles, Cal.
H. M. Royal, Inc.
LOgan 3261

PATERSON 3, NEW JERSEY



VULCANOL*

The VULCANOLS REPRESENT a group of durable textile finishes which, when coated on textile fabrics, provide fiber conservation, pile anchorage, non-skid properties, slip resistance, and resistance to raveling or fraying.

Distributors for Firestone Liberian Latex

Our Sales and Technical Staffs Are at Your Disposal

*Registered Trademark

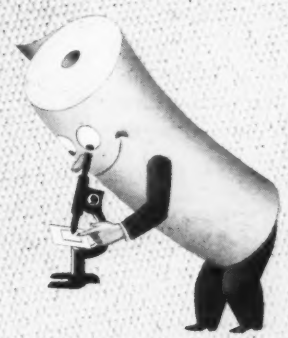
ALCO OIL & CHEMICAL CORPORATION

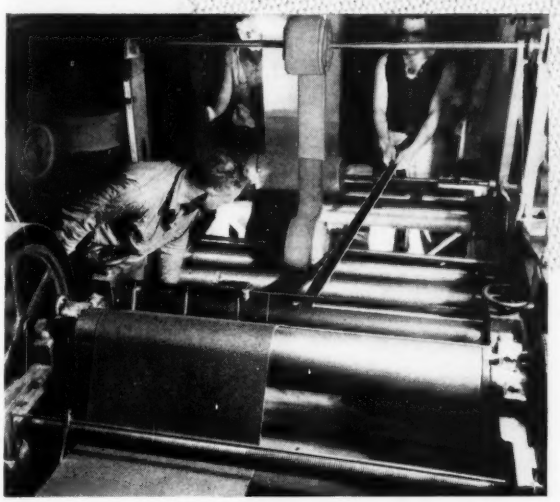
TRENTON AVE. and WILLIAM ST., PHILADELPHIA 34, PA.

NEW ENGLAND OFFICE
Alco Oil & Chemical Corp.
610 Industrial Trust Bldg.
111 Westminister St.
Providence 3, R. I.
Phone: ELmhurst 1-4559

UNIFORMITY
Makes The Big Difference
In INDUSTRIAL FABRICS

MT. VERNON FABRICS
Give You Greater Fabric Uniformity





Checking evenness of roving with Belger Tester.

One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products.

Mt. Vernon-Woodberry Mills

Branch Offices: Chicago • Atlanta
Baltimore • Boston • Los Angeles

TURNER HALSEY
COMPANY
Selling Agents
40 WORTH ST. - NEW YORK

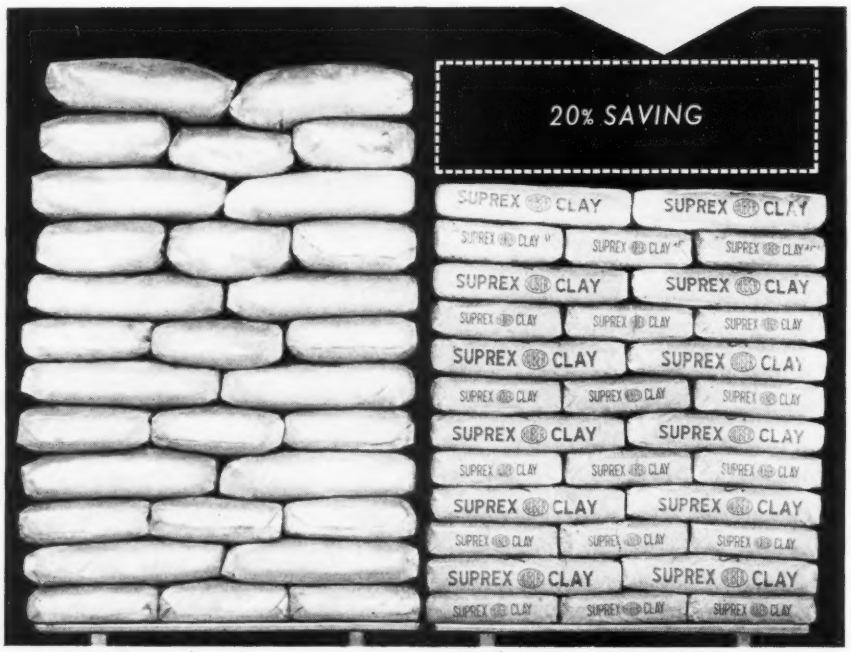
FABRICS ENGINEERED TO FIT YOUR NEEDS

Need adaptation of an existing fabric to your special purposes? Or creation of an entirely NEW fabric — cotton, synthetic or blend — to meet your specifications? Mt. Vernon-Woodberry's staff of textile engineers is available on request to help you with your problems in development or application of industrial fabrics.

In 1951 *Huber Cut Your Clay Storage Costs* 20%

"De-aerated" Huber Clay bags are smaller, more compact for neater stacking and easier handling. They are sealed better by tightly-closed bag valves.

The first-rate quality of SUPREX Clay is not altered in any way by Huber "de-aerating." Huber SUPREX Clay continues to set the standard for the rubber industry throughout the world.



3,000 lbs.... ordinary bags

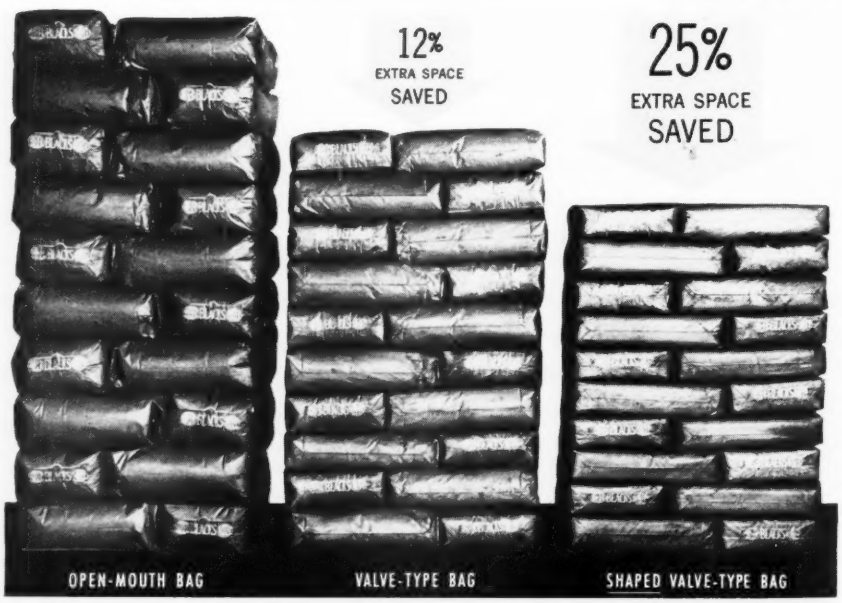
3,000 lbs.... Huber "de-aerated" bags

In 1953 *Huber Cuts Your Carbon Black Storage Costs* 25%

These *Shaped* Valve-Type Bags are easier to handle, make a firm, solid load. They are Huber's latest achievement in simplification and improvement of carbon black handling for the rubber industry.

The fine properties and high qualities of Huber Carbon Black remain unaffected by this new packaging design.

Now available in 50-pound bags for Huber Wyex (EPC), Arrow TX (MPC) and Aromex (HAF), shaped valve bags will shortly be extended to all Huber carbon black grades.



HUBER **J. M. HUBER CORPORATION** • *100 Park Avenue, New York 17, N.Y.*

Manufacturers of

- FURNACE BLACK
- CHANNEL BLACK
- RUBBER CLAYS
- RUBBER CHEMICALS

INDIA
RUBBER WORLD
A Bill Brothers Publication

AUGUST, 1953
Vol. 128—No. 5

NBP CCA

SUBSCRIPTION PRICES

United States and Mexico, $5.00 per year; Canada, $6.00; all other countries, $7.00. Single copies in the U. S., 50¢; elsewhere, 60¢.

Other Bill Publications are: FOUNTAIN & FAST FOOD, GROCER-GRAPHIC, PREMIUM PRACTICE, RUG PROFITS, Sales Management, TIRES—TBA Merchandising, YANKEE FOOD MERCHANT.

Copyright August, 1953
Bill Brothers Publishing Corp.

Table of Contents

Coefficients of Friction of Rubber Samples
James A. Hurry and John D. Prock 619

Migration Effects in Oven Aging
A. E. Juve and R. Shearer 623

A Simple Compression Plastometer
E. F. Linhorst 626

Methods Employed in Compounding Research—IX
I. Drogin 627

Processing of Rigid Polyvinyl Chloride Plastic
C. E. Parks 631

Rubber Division, A. C. S., Chicago Meeting 636

Departments

Editorials 630
Plastics Technology 631
Scientific and Technical Activities 636
News of the Month:
United States 649
Canada 659
Obituary 666
Financial 694
Foreign Trade Opportunities 696
New Machinery 668
Materials 672
Goods 674
Rubber Industry in Europe 678
Far East 681
Africa 683
Book Reviews 684
New Publications 684
Bibliography 687

Market Reviews

Rubber 690
Reclaimed Rubber 690
Scrap Rubber 690
Cotton and Fabrics 690
Rayon 692
Compounding Ingredients 692

Statistics

United States, for April, 1953 .. 696
Carbon Black, First Quarter, 1953 692
Imports, Exports, and Reexports of Crude and Manufactured Rubber 696
Tire Production, Shipments, and Inventory 692

CLASSIFIED ADVERTISEMENTS .. 693

ADVERTISERS' INDEX 699

India RUBBER WORLD assumes no responsibility for the statements and opinions advanced by contributors.

A BILL BROTHERS PUBLICATION

Published monthly by

BILL BROTHERS PUBLISHING CORPORATION

Editorial and Executive
386 Fourth Ave.,
New York 16, N. Y.
LExington 2-1760

Office of Publication
1309 Noble St.
Philadelphia 23,
Pennsylvania

Chicago Office: 333 N. Michigan Ave.
STate 2-1266

Editorial Advisory Board

JOHN BALL
P. D. BRASS
BERNARD H. CAPEN
C. C. DAVIS
J. H. FIELDING
S. D. GEHMAN
WILLIAM C. GOGGIN
WILLIAM E. KAVENAGH
R. A. SCHATZEL
JOHN N. STREET

B. BRITTAIN WILSON, *General Manager*
ROBERT G. SEAMAN, *Editor*
S. R. HAGUE, *Managing Editor*
ARTHUR M. MERRILL, *Associate Editor*
RUFUS H. FAIRCHILD, *Advertising Manager*
M. J. McCARTHY, *Circulation Manager*
M. A. LARSON, *Production Manager*

Chairman of Board and Treasurer
RAYMOND BILL

Vice Presidents
B. BRITTAIN WILSON
C. ERNEST LOVEJOY
WM. H. McCLEARY

President and General Manager
EDWARD LYMAN BILL

WIRE and CABLE . .

Compounding Suggestions

BISMATE

C. V. Accelerator for NATURAL RUBBER

Produces Fast Cures, High Physical Properties

CUMATE

Developed and Recommended

for GR-S

TELLURAC

Efficient Accelerator

for BUTYL Vulcanization

AGERITES—WHITE and RESIN D

Antioxidant Combination for

Use in Meeting Critical

Aging Specifications

R. T. VANDERBILT CO. INC.

230 Park Avenue, New York 17, N. Y.

INDIA
RUBBER
WORLD

VOL. 128—NO. 5 AUGUST, 1953

Coefficients of Friction of Rubber Samples

James A. Hurry[1] and John D. Prock[1]

A STUDY of friction and the determination of the coefficients of friction is certainly not novel in itself. Measurements of the coefficients of friction have been made by investigators using various methods and approaches. An excellent general summary of work in friction is given in a paper by Frederick Palmer.[2]

Our paper presents findings of novel and practical interest, and it is our belief that the conclusions presented herein will generate further thinking on this important and very practical subject.

A knowledge of the coefficients of friction between surfaces is important in the design of many products. Knowledge of general laws of friction and of the coefficients of friction is indispensable in obtaining the best design in a given application whether we wish to obtain high or low resistance to slip or skid.

The "classical laws" of sliding friction (as customarily cited in books) may be summarized as follows:[2]

1. Frictional force is directly proportional to the load, that is, to the total force which acts normal to the sliding surface.

2. Frictional force for a constant load is independent of the area of contact.

3. Frictional force is independent of the velocity of sliding.

4. Frictional force depends upon the nature of materials in contact.

The above or foregoing "laws" of sliding friction were based upon experiments using so-called "rigid" bodies.

A rubber product or object, on the other hand, is normally a distensible object in contrast to metals, wood, etc., which have been considered "rigid" bodies. Many additional problems of measurement and analysis might arise for materials having a rubber-plastic nature.

Some examples illustrating the importance of friction and of a knowledge of the laws of friction, are as follows: (a) a tire exerting tractive effort or force against the road (starting, running, or stopping); (b) a power transmission belt turning a pulley; (c) a "J" seal on the gate of a dam; (d) rubber feet on a piece of machinery, furniture, crutches, household appliances, etc.; (e) rubber footwear.

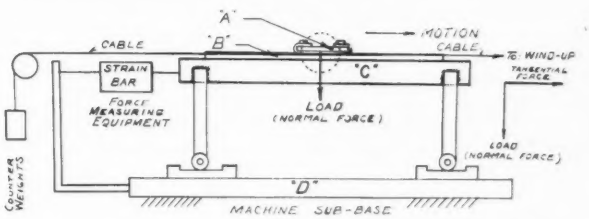


Fig. 1. Simplified Sketch of Apparatus Used—Gates Rubber Co. Modification of National Bureau of Standards Friction Machine

The usage of the effects of friction in things and life is so commonplace that its full importance is usually not recognized. It is a taken-for-granted sort of thing. Without *friction* man could not conveniently move himself or things. Friction is, therefore, basically a foundation of life itself.

The Inclined Plane

If a rubber block or a section of a rubber product is placed on a simple inclined plane, and if the angle of the plane is increased until slip or movement occurs, it is difficult to determine the angle of the plane for which "motion impends." The term "motion impends" describes the state of a body just before *actual* motion takes place.

The so-called "angle of repose," the angle of the plane at which motion impends, is necessary for the computation of the coefficient of static friction of the rubber block.

The difficulties experienced with distensible materials, in attempting a measurement of the coefficient of static friction with the inclined plane, would normally prompt two questions: namely, (a) Do the classical concepts of friction apply to the surfaces of rubber products; and if they do not, what are the governing laws? (b) In what manner does the body (rubber product) start to slip?

Objectives of the Investigation

These questions and others helped clarify the objectives which would be necessary in an investigation. The specific purposes of this investigation can now be given.

[1] Gates Rubber Co., Denver, Colo.
[2] "What about Friction?" *Am. J. Phys.*, Apr., 1949, p. 181.

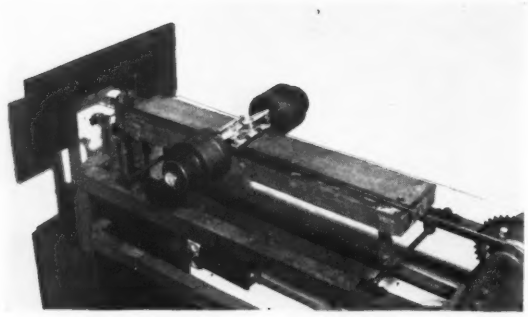


Fig. 2. Gates Machine for Coefficient of Friction Studies on Rubber

They are to study: (a) the "start of the slip"; (b) the relation between tangential and normal force; (c) the effect of "slip velocity"; (d) the effect of wear or "break-in" on the coefficients of friction for a rubber product.

The Apparatus

The apparatus used in this work was the Gates modification of the National Bureau of Standards friction machine. A simplified sketch of the apparatus is shown in Figure 1. The apparatus consisted of a combined sample holder and loading unit, "A," a friction surface, "B," a heavy friction surface support, "C," and the machine bed, "D." Photographs of the apparatus are shown in Figures 2 and 3.

The sample holder and loading unit, "A," was designed so that the center of mass of the system was in the plane of the friction surface, "B." The friction surface, "B", was a polished steel surface. The surface smoothness as measured with a profilometer (an instrument specifically designed to measure smoothness or roughness of a surface) in the direction of slip, was 12 micro-inches root mean square.

The sample holder was attached to wires which went to the wind-up unit. Bed "C" was supported by legs and rollers by the machine bed, "D." Friction surface, "B," and its support, "C," were connected to the machine bed, "D," through strain bar force measuring equipment.

The apparatus worked in the following manner. The wind-up pulls the sample holder and loading unit along the friction plane, "B." Normal forces were obtained by adjusting the loads on the sample holder. The frictional forces generated exert a force on the friction plane, "B," tending to move the plane in the direction of motion of the sample holder. This force is measured by the strain bar connected to the frame of the machine, "D." The strain bar measures the frictional or tangential force. The coefficient of friction is given by the ratio of the frictional or tangential force to the normal force, e.g.

$$\text{Equation of General Form } \mu = \frac{\text{Frictional Force}}{\text{Normal Force}} = \frac{F}{N} \qquad \text{Eq. \#1}$$

The term "normal force," as used in this paper, refers to the force exerted by the sample perpendicular to the metal friction surface ("B" of Figure 1). The term "tangential or frictional force," as used here refers to the force exerted by the sample tangent to the metal surface. The coefficient of friction *under a given set of conditions* is the ratio of the tangential or frictional force to the normal force as in the specific form, Equation # 2.

$$\text{Equation of Specific Form } \mu = \left[\frac{F_t}{F_n}\right] \text{ at conditions} \qquad \text{Eq. \#2}$$

Where μ = the coefficient of friction
F_t = tangential or frictional force
F_n = normal force

The original NBS machine is described in a paper by Roth, Driscoll, and Holt.[3]

The full significance of Equation #2 is very important because it should be remembered that the forces acting on the friction specimens in the sample holder are a function of the specific conditions of test (e.g., temperature, surface condition, velocity, acceleration, etc.). All measurements were made in a temperature and humidity controlled laboratory at 70° F. and 25% relative humidity.

Selection and Preparation of Surfaces

The condition of a surface after use is probably more important than the "new" condition as far as dynamic surface friction is concerned. For this reason it was desirable to choose samples which could be given a known amount of break-in under known conditions. The sidewall of a belt is an example of a product which shows noticeable change after slight usage; so for convenience of run-in, samples from belts were chosen for this investigation. The types of belts used in this study were selected from a pool of belts representative of the industry as a whole.

Belts from which belt sidewall samples were to be obtained were given the desired amount of "run-in" or "break-in" in a belt testing laboratory. The friction test samples were prepared by cutting a slice from the belt (cut parallel to the sidewall) with a band saw, then grinding the cut surface to obtain uniform thickness. Due care was exercised not to disturb the outer surface of the belt sidewall which had been "broken-in" or "run-in." Each sample consisted of two strips of belt sidewall about eight inches long and ⅛-inch thick. During the tests about four inches of each strip, when in the sample holder, were (apparently) in contact with the metal surface. The other four inches were necessary for clamping in the sample holder. One sample from each belt was used. The samples were cleaned with a clean, non-linty, cloth, wet with acetone, the day before measurements were made. The metal surface was cleaned before each test by applying a liberal amount of MEK (methyl ethyl ketone).

[3] "Frictional Properties of Rubber," *Nat. Bur. Standards* (U. S.), Research Paper RP1463.

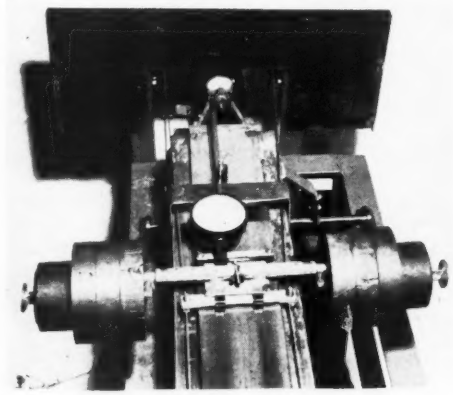


Fig. 3. Gates Machine Modified to Study "Start of Slip"; Additional Dial Indicator Mounted on Horizontal Track to Register Displacement of Sample Holder

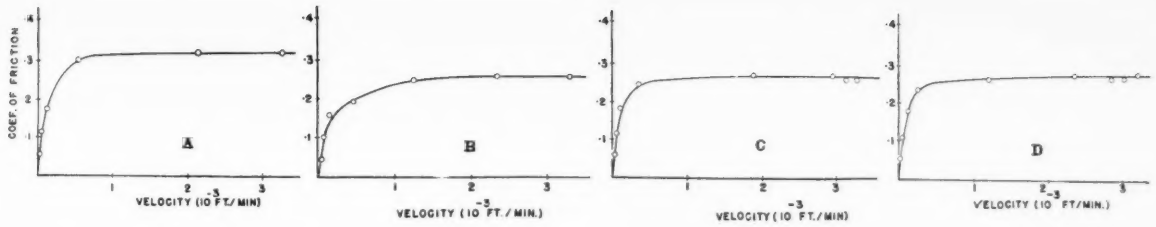


Fig. 4. "Start of Slip" Coefficient of Friction vs. Velocity—A—No "Run-In"; B—Five-Minute "Run-In"; C—One-Hour "Run-In"; D—96-Hour "Run-In"

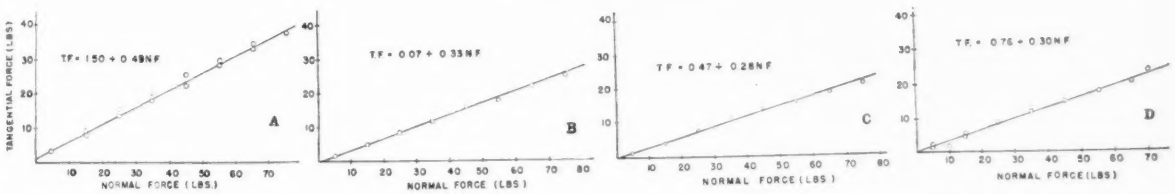


Fig. 5. Tangential Force vs. Normal Force (Velocity 0.05-Ft./Min.)—A—No "Run-In"; B—Five-Minute "Run-In"; C—One-Hour "Run-In"; D—96-Hour "Run-In." (The Equations Shown Represent a Linear "Least Squares" Relation between TF and NF)

Sample Types and "Run-in"

Three different belt types (same belt cross-section and length) were used in the evaluations. These will be referred to as Types A, B, and C. Each belt type was divided into five groups, with three belts per group. One test sample was taken from each belt. They were subjected to "run-in" conditioning of 0, 1/12, 1, 24, and 96 hours, respectively, on a belt laboratory test unit. The test conditions of "run-in" were similar to conditions *incurred in service applications.*

The Start of the Slip

Knowledge of the way in which the samples start to slide is most important as specific information will show. In order to obtain these data, an additional dial indicator was mounted on the horizontal track, as shown in Figure 3, so that it would show and register the displacement of the sample holder. Values of the sample displacement and of the tangential force were recorded at given time intervals as determined by a stop watch. From these data the change in coefficient of friction with velocity at the start of the slide was determined as per Equation #2. The change in displacement during a given time interval divided by the time determined the slip and/or strain velocity.

Data were obtained for one sample from each group. A representative set of data is shown in Figures 4A-4D. It will be noted that the samples start out very slowly and gradually approach a velocity determined by the rate of cable wind-up. It should be noted that *there is no point on these curves that would correspond to the conventional static coefficient of friction.* Parts of these curves may be due to strain alone, and parts may be a combination of strain and slip. The two effects could not be separated. The slope of the curve is the acceleration of the sample holder.

The similarity of the curves is most striking considering the fact that we had three different types of belt sidewalls and five conditions of "break-in" ranging from 0 to 96 hours.

The Relation between F_t and F_n

The relation between tangential and normal forces, F_t and F_n, was investigated for one sample from each group at a slip velocity of 0.05-foot per minute. All of the points on a single curve were obtained without removing the sample from the track. The weights, on the sample holder, were changed as the sample continued to slide. Points were determined for increasing normal force and then decreasing normal force. This procedure gave two points for each value of normal force except the maximum. This also minimized the effect of any mechanical lag in the measuring system. (See Figures 5A-5D.)

The equations shown in each case in Figures 5A-5D are for a linear least squares fit of the data (tangential force, TF, *versus* normal force, NF,[4] e.g., in Figure 5A, tangential force equals 1.5 plus 0.49 normal force). In all cases the points fall very close to the curves shown.

From these data it appears that in most cases, especially after the belts are conditioned (e.g., "run-in"), *the tangential or frictional force is proportional to the normal force.*

Effect of Slip Velocity

Figure 6 is representative of data obtained with coefficient of friction as a function of slip velocity. In each case the sample was allowed to slide until it reached a constant velocity before data were recorded. The veloc-

[4] H. A. Freeman, "Industrial Statistics," John Wiley & Sons, New York (1942).

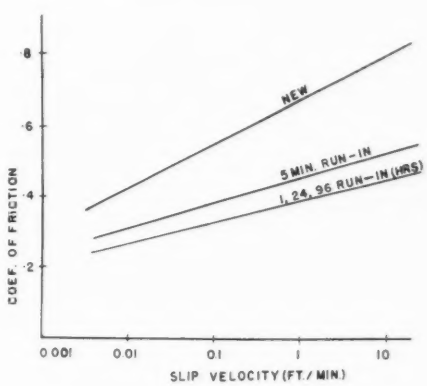


Fig. 6. Coefficient of Friction vs. Slip Velocity Showing Effect of "Run-In"

ity was changed by changes in the speed reduction mechanism between the motor and the wind-up. The distance required for the sample to start and stop limited the velocity which could be used with the apparatus. The upper limit of velocity which could be handled with the apparatus used did not exceed 10 feet per minute.

From all of the data obtained it can be said that within the velocity range investigated *the coefficient of friction generally appears to increase with an increase in slip velocity*. It can also be said that in most cases there has to be a change in the order of magnitude of the slip velocity to produce a noticeable change in the coefficient of friction.

Some consideration has been given to determining an exact *function* that would fit these data. A completely satisfactory function was not found.

Figure 7 is presented to show the degree of scattering of points. All belts of one type that had one hour, 24 hours, and 96 hours "run-in" were grouped together. The numbers 1, 2, or 3 with the points indicate multiplicity of the datum points.

The Effect of Wear

The coefficient of friction between surfaces is, among other things, a function of the type of surface and of the surface condition. This point is clearly shown in Figure 6. The coefficient of friction obtained for samples from new belts and belts with five-minute "run-in" was higher with more scattering than data for samples that had one hour, 24 hours, and 96 hours "run-in."

Comparison of Sample Types A, B, and C (Same "Run-in" Conditions)

Figure 8 shows the relation between the coefficient of friction and the slip velocity for Types A, B, and C belt sidewalls. The change of the coefficient of friction with velocity is not too much different for each of the three types (slope of the curves). There is some differences for the coefficient of friction between Types A, B, and C at any given slip velocity. The data are presented here to show specifically that differences do exist between the different types.

Summary of Significant Findings

1. This study appears to indicate that the samples start to slide in such a way that *there is no distinct coefficient of static friction*. More boldly stated, we can say that the *coefficient of static friction has no meaning* for the samples used under the conditions of testing described.

2. The frictional or tangential force is directly proportional to the normal force for all samples that were given at least one-hour "run-in." This point is in agreement with the "classical" laws.

3. In general, an increase in the coefficient of friction occurs for an increase in the slip velocity. This point is *not* in agreement with the classical laws.

4. A loss or decrease in the coefficient of friction, among other things, occurs as a result of wear and is greatest during the first five minutes of "break-in" or "run-in."

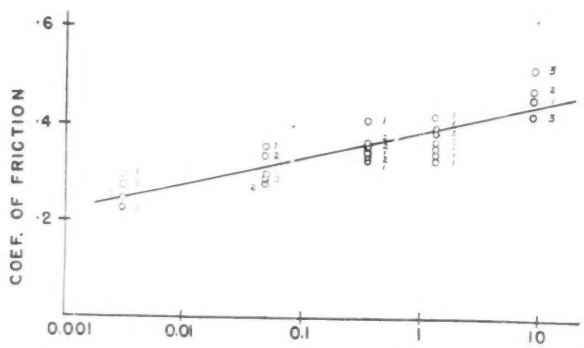


Fig. 7. Coefficient of Friction vs. Slip Velocity; One Belt Type after One-, 24-, and 96-Hour "Run-In" (Grouped Together) Showing Scattering of Data

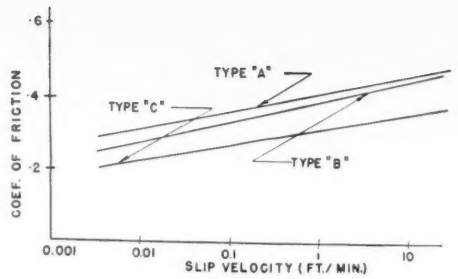


Fig. 8. Coefficient of Friction vs. Slip Velocity for Different Belt Types

General Summary

The definition of a coefficient of static friction, which involves usually the concept of impending motion, appears to have *no meaning* in the conventional sense, as shown in the "Start of the Slip" section of this paper. In other words, if a tangential force is applied to a sample, the sample will seek a slip velocity that is determined by the tangential force applied. This statement means that no higher tangential force needs to be applied initially to start movement than is required to maintain movement. From a practical standpoint this point is very significant.

The frictional force is directly proportional to the normal force for samples which had sufficient "run-in" (one hour or more). One should be cautious about using this finding with respect to "new" samples.

The increase in the coefficient of friction which occurs with an increase in the slip velocity is also important, and it should be of considerable interest to many. The decrease in the coefficient of friction, as a result of wear, was as anticipated and in consequence should be perhaps less disturbing to the reader than some of the other findings obtained.

Acknowledgments

The authors wish to acknowledge the helpful cooperation of the Gates technical management in providing equipment and instrumentation for this research.

We gratefully acknowledge the permission of the Gates Rubber Co. to have this work published.

New Fire Hose

THE B. F. Goodrich Co., Akron, O., has developed a new fire hose, called Highflex, with weight and flexibility properties greatly improved over those of the standard fire hose. These improvements are said to include 20 pounds less weight per 100 feet of hose; and racking of 500 additional feet of hose per standard truck. Dacron, a synthetic fiber woven into the fabric hose cover, is credited with these improvements and is also claimed to be three times stronger than the same weight of cord previously used.

Migration Effects in Oven Aging

A. E. Juve[1] and R. Shearer[1]

OVEN aging tests on rubber compositions are known to be affected by other compositions with which they might be aged. The American Society for Testing Materials Method D573[2] recognizes that this affecting does occur, and the procedure specifies that simultaneous aging of a mixed group of different compounds should be avoided if possible. Few data exist in the literature on the extent of the effect of one material on another, although a recent paper[3] has presented data on this point for the oxygen bomb method.[4]

Aside from the effect on one material by another when aged simultaneously, there is also the possibility that ovens may become contaminated by continued use so that even though simultaneous aging is avoided, an undesired effect may be produced.

This study was undertaken to determine the magnitude of these effects. As a part of this report, we are also including some unreported data bearing on this subject which were obtained in a cooperative program sponsored by Section IV of the joint SAE[5]-ASTM Committee on Automotive Rubber. The authors are indebted to this committee for permission to use these data.

This latter program was undertaken to find the reason for the erratic behavior of a nitrile rubber stock vulcanized with TMTD (tetramethyl thiuram disulfide) in an earlier cooperative test program[6] designed to compare the test tube method of aging with the oven[7] method.[2] In this study the oven aging results obtained with this compound were unexpectedly erratic for those tests made at 70° C. and at 100° C. In the procedure used it was specified that the aging tests at these two temperatures could be run simultaneously with the other compounds in the test program and concurrently with other routine aging tests. Tests at 125 and 150° C., however, were to be run individually. Since the 70 and 100° C. oven tests for this material were the most erratic, a reasonable suspicion would be that this particular material was more sensitive to contamination by other materials than were the other stocks included in the program.

Procedures

For most of the tests reported herein the effects of one material on another were determined by the difference between the degradation observed for a single material aged by the test tube method and that observed when the material was aged, also by the test tube method, but with one dumbbell sandwiched between two dumbbells of the second stock and separated from them by about 1/8-inch.

SAE - ASTM Tests

For the cooperative SAE-ASTM program, aging tests were run utilizing dumbbell specimens from the same lot of material as used in the original tests. Compound No. 2 was the nitrile rubber stock referred to above, and Compound No. 3 was a natural rubber tread stock, normally compounded. Tests were run by the test tube method with a dumbbell of Compound No. 2 sandwiched between two dumbbells of Compound No. 3. For each condition of exposure three test tubes were prepared so that three specimens of Compound No. 2 would be available for testing. As controls, an additional tube containing three specimens of Compound No. 2 was run. Five laboratories participated in the tests. The times and temperatures chosen were as follows:

1024 hrs. at 70° C.
128 hrs. at 100° C.
24 hrs. at 125° C.
4 hrs. at 150° C.

Tests by Goodrich Research Center

For the program conducted in the authors' laboratory three natural rubber tread-type compositions were chosen having the formulations given below.

Compound	A	B	C
Natural rubber*	100	100	100
Zinc oxide	5	5	5
MBTS†	1	1	—
EPC black	50	50	50
Stearic acid	3	3	3
Sulfur	3	3	—
PBNA‡	—	1	1
TMTD	—	—	3.5

Cure 40 min. at 284° F.

*A blend of smoked sheets was used.
†Benzothiazyl disulfide.
‡Phenyl β-naphthylamine.

Compound B is the natural rubber tread-type recipe of ASTM Method D-15-52T. Standard pigments obtained from the Bureau of Standards were used except for the PBNA.

Special precautions were taken to prevent contamination of the stocks prior to the start of the aging tests. The mill rolls, guides, molds, and all tools were washed with acetone before and after each stock was processed. The operators washed their hands with soap and water before and after handling each stock. Both the unvulcanized stock and the cured sheets for a particular compound were kept isolated from the other compounds to prevent any migration of materials.

The first series of tests was run for the purpose of establishing that the deterioration via the test tube method was equal to that obtained by the oven method when a new oven was used and that there was an appreciable difference in severity when an old oven was compared with a new oven. For these purposes Compounds A, B, and C were aged as follows: (a) in test tubes in accordance with D865-50T; (b) individually in a new oven in accordance with D573-48; (c) individually in an oven which had been used for many years; also in accordance with D573-48.

Compound A was aged for 100 hours, and Compounds B and C for 1,000 hours at 70° C. For both the aged and the unaged values of stress-strain six specimens were tested.

For the second series of tests Compounds A, B, and C were aged by the test-tube method at 70° C. for various

[1] B. F. Goodrich Co., Research Center, Brecksville, O.
[2] ASTM Designation D573-48, "ASTM Standards for Rubber Products," American Society for Testing Materials, 1916 Race St., Philadelphia, Pa. (Dec., 1952).
[3] M. B. Fackler, J. S. Rugg, *Anal. Chem.*, 23, 1646 (1941).
[4] ASTM Designation D572-50.
[5] Society of Automotive Engineers, 29 W. 39th St., New York, N. Y.
[6] M. G. Schoch, Jr., A. E. Juve, "Symposium on Aging of Rubbers," ASTM Special Tech. Publication No. 89 (1949).
[7] ASTM Designation D865-50T.

time intervals both alone and in various combinations as follows:

(a) Compound A aged alone, 50, 100, 200, and 400 hours.
(b) Compound B aged alone, 200, 400, 800, and 1,600 hours.
(c) Compound C aged alone, 400, 800, 1,600, and 3,200 hours.
(d) Compound A aged between two specimens of Compound B and also between two specimens of Compound C for 50, 100, 200, and 400 hours.
(e) Compound B aged between two specimens of Compound A and also between two specimens of Compound C for 200, 400, 800, and 1,600 hours.
(f) Compound C aged between two specimens of Compound A and also between two specimens of Compound B for 400, 800, 1,600, and 3,200 hours.

In each case a sufficient number of test tubes were aged at each interval so that six specimens of the compound of interest could be tested.

Separate mixes were made for the two series of tests which were run at different times. For this reason the results obtained in the two series are not strictly intercomparable.

In all cases the median values for tensile strength and modulus were determined.

Results

For the cooperative test program the pertinent data are given in Tables 1, 2, and 3. In Table 1 are given the averages for 300% modulus, tensile strength, and elongation for the three specimens tested under each of the conditions chosen and for each of the five laboratories. The very marked differences between the two sets of data are evidence of a migration effect of some material originating in the conventional stock and affecting the TMTD cured nitrile rubber stock. It was observed that in all cases the specimens of Compound No. 2 sandwiched between specimens of Compound No. 3 developed a hard surface crust. As a matter of interest the average results previously reported[6] for these aging periods by the test-tube method are also shown. The agreement between the two sets of data is quite good.

TABLE 1. COMPOUND NO. 2 AGED BY TEST-TUBE METHOD

		Aged Alone			Aged between Two Specimens of Compound No. 3†	
Time and Temperature	Lab. No.	300% Mod. Psi.	Tensile Psi.	% Elong.	Tensile Psi.	% Elong.
1024 hrs. at 70° C.	1	1658	2658	483	633	83
	2	1883	2653	440	550	107
	3	*	2773	450	556	83
	4	1987	3050	453	663	100
	5	1769	2696	510	631	112
	Ave.	1824	2766	465	605	97
Ave. of previous tests		1861	2776	439		
128 hrs. at 100° C.	1	1817	2658	460	600	123
	2	1793	2627	407	733	160
	3	*	2167	308	642	100
	4	2180	2723	393	823	156
	5	2095	2594	387	827	175
	Ave.	1971	2554	391	725	143
Ave. of previous tests		1863	2724	439		
24 hrs. at 125° C.	1	1758	2558	450	912	200
	2	1950	2713	420	1063	213
	3	*	2537	516	741	168
	4	2150	2915	405	990	193
	5	2055	2656	400	1007	250
	Ave.	1978	2676	438	943	205
Ave. of previous tests		1819	2714	443		
4 hrs. at 150° C.	1†	1575	2675	443	950	310
	2	1587	2583	460	1217	290
	3	*	2707	492	1037	233
	4	1730	2680	470	1173	250
	5	1645	2576	450	1127	275
	Ave.	1634	2644	463	1101	272
Ave. of previous tests		1475	2580	491		

*Modulus values not reported.
†Only one result was obtained for 300% modulus, psi., which was 687, for Lab. No. 1—4 hrs. at 150° C.

The individual results from each laboratory for the oven aged specimens of this same compound at 70 and 100° C., some of which were not included in the previous report,[6] are shown in Table 2. It is apparent that the degree of the migration effect varied widely from one laboratory to the next.

TABLE 2. OVEN AGED RESULTS FOR COMPOUND NO. 2

Aging Time and Temp.	Lab. No.	300% Mod. Psi.	Tensile Psi.	Elong. %
1024 hrs. at 70° C.	1	—	1800	275
	3	—	628	100
	5	2022	2515	420
128 hrs. at 100° C.	1	—	1500	220
	3	—	966	172
	5	2076	2236	320
	6	1679	2548	448

One laboratory in this test program reported the stress-strain data on the specimens of Compound No. 3 between which the specimens of Compound No. 2 were sandwiched. A comparison of these results with the averages previously reported for the test aging for the same times and temperatures should give an indication of the effect of Compound No. 2 on Compound No. 3. These data are given in Table 3 and show that in this case also an appreciable, though less radical, effect was found.

TABLE 3. AGING DATA ON COMPOUND NO. 3

	Aged with Cpd. No. 2 Present Data*		Aged Alone Previous Data		
Aging Time and Temp.	Tensile Psi.	Elong. %	300% Mod. Psi.	Tensile Psi.	Elong. %
1024 hrs. at 70° C.	1108	252	1635	1945	371
128 hrs. at 100° C.	520	115	—	882	156
24 hrs. at 125° C.	315	70	—	356	81
4 hrs. at 150° C*.	690	343	620	864	370

*Only one result was obtained for 300% modulus, psi., which was 572, for 4 hrs. at 150° C.

The results of the first series of tests run in the authors' laboratory are given in Table 4. These data show that the test-tube method and the oven method give results which are nearly identical when a new, uncontaminated oven is used; but when an old oven is used, greater deterioration of all three stocks is observed.

TABLE 4. COMPARISON BETWEEN TEST TUBE, NEW OVEN, AND OLD OVEN AT 70° C.

	300% Modulus	% Retained	Tensile Strength	% Retained	Elongation	% Retained
Compound A						
Orig.	2250		3955		480	
100 hrs. in T. T.	1985	88.2	2895	73.2	420	87.4
New oven	1915	85	2780	70.3	425	88.5
Old oven	1765	78.3	2400	60.7	395	82.3
Compound B						
Orig.	2440		4345		495	
1000 hrs. in T. T.	—		1410	32.3	230	46.5
New oven	—		1355	31	220	44.4
Old oven	—		1010	23.2	195	39.4
Compound C						
Orig.	2010		3775		470	
1000 hrs. in T. T.	2305	114.8	3215	85.2	390	82.8
New oven	2340	116.3	3155	83.5	387	82.3
Old oven	2525	125.9	2875	76.2	335	71.2

The results of the second series of tests are given graphically in Figures 1 to 6 inclusive.

In Figures 1 and 2, Compound A is shown to deteriorate less for aging times of more than 100 hours when aged in close proximity to specimens of Compounds B and C.

In Figures 3 and 4, Compound B is shown to be relatively unaffected by aging in close proximity to specimens of Compound A and Compound C.

In Figures 5 and 6, Compound C is shown to deteriorate very much faster when aged in close proximity to specimens of Compounds A and B than when aged alone.

Discussion

There appear to be two sources of materials which may influence the results of oven aging tests. One is contaminants from the oven itself accumulated from previous

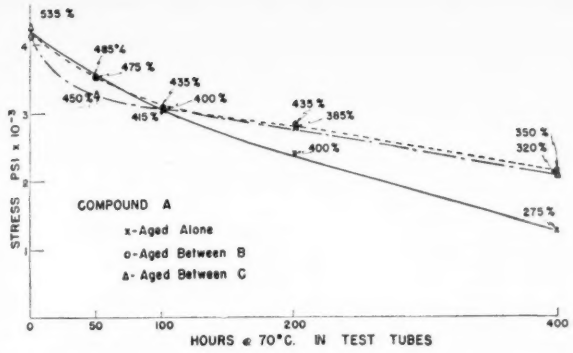


Fig. 1. Tensile Strength *vs.* Aging Time for Goodrich Compound A, Alone and between Compounds B and C

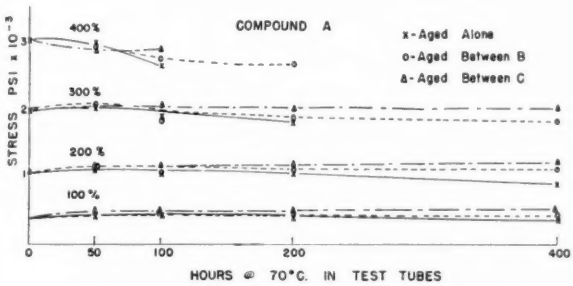


Fig. 2. Modulus *vs.* Aging Time for Goodrich Compound A, Alone and between Compounds B and C

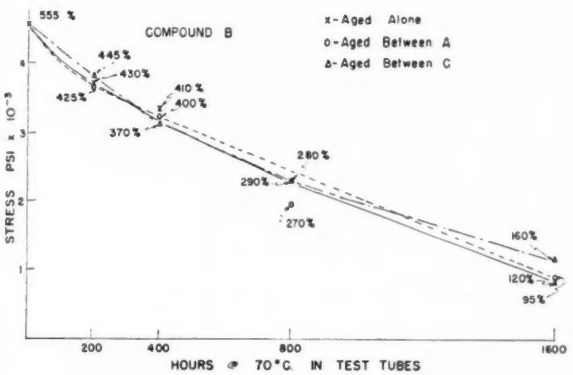


Fig. 3. Tensile Strength *vs.* Aging Time for Goodrich Compound B, Alone and between Compounds A and C

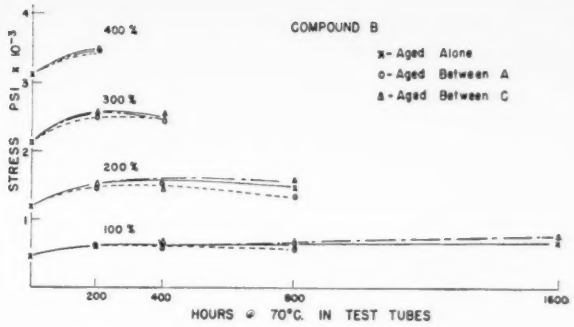


Fig. 4. Modulus *vs.* Aging Time for Goodrich Compound B, Alone and between Compounds A and C

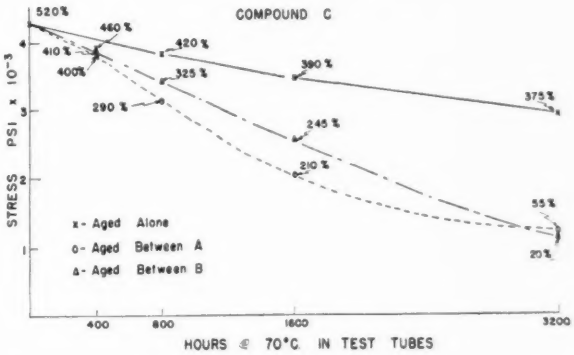


Fig. 5. Tensile Strength *vs.* Aging Time for Goodrich Compound C, Alone and between Compounds A and B

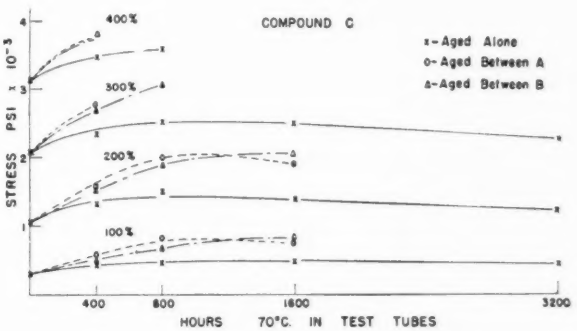


Fig. 6. Modulus *vs.* Aging Time for Goodrich Compound C, Alone and between Compounds A and B

tests, and the other from other materials which may be aged simultaneously with the stock of interest. The former appear always to have an adverse effect; while the latter may have either a beneficial or adverse effect.

The nature of the contaminants in a used oven was not investigated, but since they have an adverse effect, even on a stock containing no age resister, they are obviously not age resisters. They could be relatively stable peroxides as well as a variety of sulfur compounds.

In the SAE-ASTM cooperative program the stiffening and crust formation of Compound No. 2 (a TMTD vulcanized nitrile rubber stock), when aged either in ovens with mixed compounds or in test tubes in close proximity to Compound No. 3 (a normal sulfur stock) are no doubt due to the migration of sulfur or sulfur compounds capable of further cross-linking of the TMTD vulcanized stock.

The beneficial effect of Compounds B and C, both of which contained PBNA, on Compound A, which contained no age resister in the Goodrich tests, is no doubt due to the migration of some of the PBNA to Compound A. The adverse effect of Compounds A and B on Compound C is similar to the case of Compound No. 2 discussed above.

Conclusions

Aging of materials individually in ovens contaminated from previous usage does not assure freedom from contamination. These contaminants cause an increase in the rate of deterioration.

Materials migrating from unlike stocks aged together may have varying effects, adverse, beneficial, or no effect, depending on the compositions being employed.

The test-tube method of aging is an excellent method for studying these migration effects as well as for conducting routine aging tests in their complete absence.

A Simple Compression Plastometer

A Simple Compression Plastometer

E. F. Linhorst[1]

A NEW design of a compression plastometer has recently come into use in the Fort Wayne, Ind., plant of United States Rubber Co. The plastometer is used to obtain a measure of the ability of uncured rubber to flow during molding processes.

The apparatus, shown in the accompanying illustration, has two springs that exert a nearly constant force of eight pounds on a sample of uncured rubber held between two round platens, each ½-inch in diameter. A dial gage indicates in mils the thickness of the rubber sample remaining between the platens at any time after the test has been started. The sample is originally a disk 9/16-inch in diameter and about 0.090-inch thick.

In running the test, the operator places the rubber sample between two 400-mesh waterproof emery paper disks 5/8-inch in diameter, to prevent slippage, and inserts the resulting sandwich between the platens. The dial of the gage is adjusted so that it shows a zero reading when the two disks of emery paper are placed between the platens, and thereafter the gage indicates the thickness of the rubber sample alone. A ⅛-inch round crossbar that passes through a ¼-inch spring-actuated plunger rod enables the operator to separate the platens with index and middle finger while pressing with his thumb on the top of the frame of the plastometer. As soon as the sample has been inserted and the pressure applied, the operator immerses the lower end of the plastometer to a depth of about five inches in a bath of glycerol or some other suitable liquid held at a proper temperature, which may be 250° F., and thermostatically controlled. The sample quickly softens and flows out between the platens, decreasing in thickness until initial curing or scorching stops the flow. In rapidly curing stocks the thickness usually approaches a constant value of about 10 to 30 mils in less than 15 minutes at 250° F.

The measurement to be used for comparison purposes may be the thickness reached in a given time or the time required to reach a certain thickness. A particular stock used in a particular mold may have a critical five-minute plastometer reading below which it molds well and above which it does not. The test with this plastometer provides, therefore, a relatively simple, rapid, and accurate test for predetermining the moldability of a batch of uncured rubber stock.

By a change in the temperature at which the test is run, or in the pressure between the platens, the apparatus can be adapted for the testing of relatively soft or hard materials. Thus an informative test can be made on a sample of uncured sponge rubber at room temperature in five minutes. The plastometer has also been used to give useful data on the hardness of such plastics as the cellulose esters.

[1] United States Rubber Co., Fort Wayne, Ind.

Osmometer for Odor Strength Determination

A NEW instrument which is claimed to standardize the conditions for accurate reproducibility and identification of the strength of an odor has been developed by Odor Instruments, Inc., New York, N. Y. Using the human nose as the only variable factor, the unit is designed to permit the operator to duplicate the quantitative strength of an odor in a sample by controlling its partial pressure. The mechanism, which is portable and which may be adapted to laboratory or field use, consists of Pyrex glass parts and odorless plastics, enclosed in an aluminum case. All parts are reported to be removable and easily cleaned. The unit comes equipped with an electrical air compressor for transporting the gases.

The operation of the Osmometer is based on the air-dilution principle in which a measured amount of odorous air plus an initial measured quantity of odor-free air is introduced into the mixing flask. The pressure of this mixture is called the odor increment pressure (O.I.P.). Additional free air is admitted to bring the total pressure (T.P.) to a constant value standard for all experiments. This mixture is then inhaled by the operator, and the O.I.P. is recorded at that value where the odor is barely perceptible. (In the event that the odor is too strong, the partial pressure of the odorous gas in the mixture is reduced, and the procedure is repeated; if the operator cannot detect an odor, the amount of odorous gas is increased.) The concentration at which the O.I.P. is recorded is called the threshold value and can be mathematically expressed by an odor threshold number which is equal to T.P/O.I.P.

By this system, strong odors have large numbers and weak odors small numbers (range of O.T.N., 3.0-30.0). It is claimed that results never vary more than 4-5% between operators.

Methods Employed in Compounding Research—IX[1]

Ingredients for Compounding Research

I. Drogin[2]

THE following installment continues the section on ingredients for compounding research which was begun in our December, 1952, issue. Part I of this series appeared in our October, 1952, issue.

Chlorotrifluoroethylene

Interest in the fluorocarbon field was stimulated by the advent of World War II. As a result of heavy pressure developed from urgent military requirements, very important strides were made in the development of fluorine-containing organic derivatives. Various branches of the Armed Services and the Research & Development Board have, according to Hanford (176),[3] repeatedly emphasized the need of rubber-like compositions which will maintain their elastic properties at temperatures as low as —65 to —70° F. and which will not be materially damaged at temperatures as low as —80 to —90° F. In addition, such products should retain their elasticity at temperatures as high as 160° F. and possibly higher. They must also be inert to aromatic and aliphatic hydrocarbons and to other common fuels and lubricants over the temperature range of about —65 to 165° F.

Prominent in the field of fluorocarbons are polytrifluorochloroethylene, $CF_2=CFCl$ (more commonly known at Fluorothene[4] and Kel-F[5]), and polytetrafluoroethylene, $CF_2=CF_2$ (more commonly known as Teflon[6] types. These, according to Hanford (176), have useful, unusual, and unique properties which are retained over temperature ranges considerably wider than those set up or required for Arctic rubber.

Developments in the field of chlorotrifluoroethylene were discussed at a recent symposium of the Division of Polymer Chemistry of the American Chemical Society.[7] According to Myers (177), chlorotrifluoroethylene, $CClF=CF_2$, has been found to react with molecular oxygen at room temperature and autogenous pressures to yield a compound (or compounds) which, on hydrolysis, yields oxalic acid, hydrogen fluoride, and hydrogen chloride.

The molecular weight of polychlorofluoroethylene, as pointed out by Boldebuck (178), degrades rapidly and extensively in vacuum at 250 and 300° C. The degradation appears to proceed by chain cleavage rather than by depolymerization through loss of monomer units. Oxygen and oxidizing agents have a marked inhibiting effect on the thermal degradation.

Polychlorotrifluoroethylene has, according to Gladstone (179), been found to react at elevated temperatures with hydrocarbons and other organic substances to yield hydrochloric acid with concomitant degradation of the polymer. Metals, metallic chlorides and oxides, and amines greatly increase this effect.

Hamilton (180) developed a suitable polymerization system for chlorotrifluoroethylene by using silver ion to activate an aqueous persulfate-bisulfate redox system. He obtained a high molecular weight polymer at satisfactory rates. By the use of this system, the effect of several variables and the amount of polymer formed and its quality were determined. The variables studied were silver ion concentration, monomer-aqueous phase ratio, pH, temperature, agitation, and mechanical contaminants such as grease and iron.

Owing to the very low solubility of monochlorotrifluoroethylene, CF_2CFCl, at ordinary temperatures, Kaufman and Solomon (181) developed high-temperature techniques for the fractionation of the polymer and for the determination of intrinsic viscosities. Data are presented for a number of samples, including commercial-type polymer of various molecular weight grades and one sample each of mechanically and thermally degraded polymer.

The copolymerization of the two fluorinated olefins, $CF_2=CFCl$ and $CF_2=CCl_2$, with two hydrocarbon dienes, butadiene and isoprene, were part of a research program by Honn, Martin, Copenhaver, Griffis, and Montermoso (182) aimed toward the synthesis of oil-resistant elastomers which retain their rubber-like properties from —65 to +160° F. The tentative conclusions reached were: (1) higher polymerization temperatures are preferred for better low-temperature properties; (2) butadiene copolymers are superior to isoprene copolymers at low temperatures; and (3) the —CFCl group confers more oil resistant and better low-temperature characteristics on a diene rubber than the $—CCl_2$ group.

The suspension polymerization of chlorotrifluoroethylene has, according to Elliott and Myers (183), been found to be affected by a sodium bisulfite-ferric-triphosphate activated system using tert-butyl perbenzoate as the catalyst. Various factors influencing the rate are discussed. The water:monomer ratio, ferric-triphosphate concentration, sodium bisulfate-ferric-triphosphate ratio, peroxide concentration, and initial pH, all exhibit an optimum. The most significant effect on the molecular weight is the temperature of polymerization.

The preparation of solid polymers of chlorotrifluoroethylene has, according to Miller, Dittman, Ehrenfeld, and Prober (184), been reported in the patent literature.[8]

[1] Based on a paper presented before the Ontario Rubber Section, C. I. C., Toronto, Ont., Canada, Mar. 11, 1952; The Los Angeles Rubber Group, Inc., Los Angeles, Calif., Apr. 1, 1952; and the Northern California Rubber Group, San Francisco, Calif., Apr. 10, 1952.

[2] Director of Research, United Carbon Co., Charleston, W. Va.

[3] Numbers in parentheses refer to Bibliography items at the end of this installment.

[4] Trade mark of Carbide & Carbon Chemicals Division, Union Carbide & Carbon Corp., for the plastic polymer of chlorotrifluoroethylene.

[5] Trade mark of M. W. Kellogg Co., a subsidiary of Pullman, Inc., for the plastic polymer of chlorotrifluoroethylene.

[6] Trade mark of E. I. du Pont de Nemours & Co., Inc., for tetrafluoroethylene resin.

[7] Atlantic City, N. J., Sept. 14, 1952.

[8] British patent No. 465,520 (May 3, 1937), French patent No. 796,026 (Mar. 27, 1936), and German patent No. 677,071 (June 17, 1939) — all to I. G. Farbenindustrie, A.G.

Chlorotrifluoroethylene has, according to Booth, Burchfield, Bixby, and McKelvey (185), and Locke, Brode, and Henne (186), been prepared by dechlorinating 1,1,2-trichlorotrifluoroethane (Freon 113) with zinc dust in alcohol.

The preparation of elastomers from Fluoroprene are described by Michel, Salisbury, Barney, Coffman, and Mighton (187).

FLUOROTHENE. Fluorothene, the plastic polymer of chlorotrifluoroethylene, is, according to Frey, Gibson, and Lafferty (186), produced for the Atomic Energy Commission by the Carbide & Carbon Chemicals Division, Union Carbide & Carbon Corp. It has a specific gravity of 2.111 at 25° C., is self-extinguishing, and has very low water vapor permeability and no water absorption. It has been found to be very resistant chemically and is not dissolved by any reagent at ordinary temperatures. The properties of Fluorothene have been described by Reysen and Vanstrum (189) and by Miller (190).

KEL-F. Kel-F, the plastic polymer of chlorotrifluoroethylene, is produced commercially (191) by M. W. Kellogg Co. in new production facilities costing about $1,000,000 which had been installed at Kellogg's manufacturing and development center in Jersey City, N. J. The new plant will, according to Carry (192), enable Kellogg to increase its manufacture of Kel-F to more than 1,000,000 pounds annually. This thermoplastic, according to Smith (191), had its origin in connection with the development of special materials for the Oak Ridge, Tenn., Atomic Energy Plant. It was used there in the gaseous diffusion plant because of its high resistance to corrosion. Kel-F has been in commercial production since 1947 and is already widely used in civilian production. Several forms of Kel-F have been developed including plasticizers (for combining with regular Kel-F to obtain varying degrees of flexibility). It is, also according to Carry, fabricated into radio cases, insulation, and "a hundred and one" things in the electronic industry.

Some typical proven applications of Kel-F include valve diaphragms, seats, and gaskets, drum and tank liners, vessel liner for use within a fractionating tower handling higher corrosive hydrofluoric acid (193), flexible non-corroding containers, "O" rings, "U" packings, washers, coated wire, tube socket bases, transformer terminals, machines, electrical and chemical fittings, and the like.

According to Hanford (191), Kel-F will play a definite role in changing the design and construction of such basic electrical equipment as refrigerators, air conditioning units, and television and radio sets because of its ability to aid in building smaller and more compact units.

Elastomeric compounds based on fluorocarbons which will have the elasticity of rubber over a temperature range of —80 to +250° C. are considered possible. In the packaging field Kel-F compounds for containers for corrosive liquids, chemical and food products, and better containers for medicinal products, especially those which require sterilization after packaging, should also be possible.

TEFLON. Teflon was first described by Plunkett,[9] who, it is claimed (194, 195), in the course of refrigerant research by Kinetic Chemicals, Inc., observed, in the course of storing and handling Freon compounds, that tetrafluoroethylene showed a tendency to polymerize and form an insoluble, infusible white powder. A heavy program of research work (195) was initiated by Kinetic Chemicals and du Pont on the developments of polymers of tetrafluoroethylene, and it was not until 1943 that pilot-plant production of the polymer, polytetrafluoroethylene, became possible. The entire output of this new fluorine plastic was devoted to the war effort, and it was not until the end of hostilities that during 1946 any PTFE became available for industrial appraisal (196). Its temperature characteristics and excellent electrical properties aroused interest in Great Britain, particularly for war purposes, and plans for its production were made by Imperial Chemical Industries, Ltd., in 1944. Pilot-plant production began toward the end of 1947 and is now producing regularly. The polymer is marketed by ICI under the trade name of "Fluon."

The polymer, according to Yelton (197), consists of long straight chain molecules packed closely together. The combination of this structure, with the strength of the chemical bond between carbon and fluorine, is responsible for its extreme chemical inertness and solvent-resistance, high impact strength over a wide temperature range, low dielectric losses, and resistance to elevated temperatures. This polymerized polytetrafluoroethylene, in which all of the atoms attached to the carbon chain are fluorine, is, according to Renfrew and Lewis (199), a special polymer because of its resistance to high and low temperatures, unusual chemical resistance, excellent electrical qualities, and non-adhesiveness.

Teflon is a new industrial plastic that withstands acids which dissolve gold and platinum and retains its strength and form at higher temperatures than any other known organic material (199). It is a remarkably stable substance, unique among organic compounds in chemical inertness, resistance to change at high temperatures, and extremely low dielectric loss factor. The chemical inertness of polytetrafluoroethylene is, according to Hanford and Joyce (201), so great that thermal degradation in air at temperatures ranging from 450-700° F. takes place without any carbonization. It is not attacked by such reagents as hydrochloric acid, hydrofluoric acid and chlorosulfonic acids, aqua regia, chlorine or boiling nitric acid. Even at 300° C. sulfuric acid, fused caustic, or oxygen have no effect. Polytetrafluoroethylene is neither dissolved in nor swelled by organic solvents, such as hydrocarbons, chlorinated hydrocarbons, esters and phenols, even at temperatures above the transition point of 327° C. The polymer has not been found compatible with any of a wide variety of plasticizers or with other polymeric substances.

Although tetrafluoroethylene is thermodynamically unstable, the polymer (195) is remarkable for its heat stability, and it is able to maintain its strength and dielectric properties at temperatures up to 550° F. Although it has no true melting point, PTFE undergoes a transition from its solid phase at 620° F. with a sharp drop in strength. Its maximum surface temperature for retention of shape is 250° C., and it will not decompose below 400° C. Above this figure there is a loss in weight at an increasingly high rate and evolution of volatile products, some of which are toxic.

The thermal conductivity of PTFE is very low: namely, 2.1 cal./sq. cm./hr./°C./cm. when tested on a specimen 0.46-cm. thick. Polytetrafluoroethylene is not embrittled, when subjected to low temperatures, and PTFE films flex easily at temperatures below —100° C.

Pigments are added to polytetrafluoroethylene only rarely. Inert fillers can be incorporated, if desired, by intimate mixing prior to fabrication. However, unless some specific advantage is to be gained by using fillers, they are normally omitted since their presence tends to affect adversely the physical properties of the molded polymer.

The major advantages of polytetrafluoroethylene, viz., solvent-resistance and high thermal stability, offer obsta-

[9] U. S. patent No. 2,230,654 (Feb. 4, 1941), "Tetrafluoroethylene Polymers," assigned to Kinetic Chemicals, Inc., Wilmington, Del., a partially owned subsidary of the du Pont company.

cles from the standpoint of ease in fabrication. Since there is no known solvent for the polymer, it is not possible to prepare solution varnishes from it for conventional coating applications.

As pointed out by Halliwell (201), the four major characteristics of polytetrafluoroethylene—inertness, heat resistance, dielectric strength, and non-adhesive qualities —have all been utilized in diversified mechanical, chemical, and electrical applications. Applications for which the plastic chemical should prove useful are varied. The material is suitable for gaskets, for example in pumps, pipe flanges, and vessel closures; pipes and tubing for chemical equipment; in packings for valve stems, for stirrer shafts, and in pumps; in outlets where heat endurance is of paramount importance; in jet engines, being the only plastic that will stand up under such high temperatures (202); and in electrical insulation for ultra-high frequency.

Teflon, as pointed out by James (203), is one of the most unusual plastics developed in recent years. When reduced to a liquid, Teflon has an outstanding quality as a finish for coating. Nothing will stick to it. In the rubber field it has some interesting applications. Thus, in molding rubber, ordinarily, a mold release fluid is used. By coating the molds with Teflon, no mold release fluid is required. The Teflon finish, however, cannot be sprayed on or dipped on. It must be fused on at high temperatures. Soldered parts, copper and tin, etc., cannot be recommended. It is perfect, though, for steel, iron, brass, chromium.

Teflon, according to Cornell (204), is an excellent electric insulator for many purposes, particularly where high-temperature conditions must be met. It may be used at temperatures as high as 500° F. in continuous service and withstands intermittent exposure to 600° F., and it also retains its flexibility and electrical properties as low as —100° F. Its uniform dielectric constant and power factor over an extremely wide frequency range make Teflon very useful in many electrical applications.

Teflon is chemically about as inert as glass within its useful temperature range. It is attacked by molten alkali metals (sodium or potassium) and by fluorine and chlorine difluoride, both at high temperatures and pressures. Other than these specific chemicals, published literature indicates that nothing has any effect on Teflon. This characteristic makes it ideal as a gasket material and liner in equipment in which high-temperature, high corrosive chemicals must be handled. Molded Teflon tubing with fairly thick walls is available for chemical work. The chemical properties of Teflon are very stable up to 500° F. The plastic absorbs no water at all. One of its most interesting properties is its non-adhesiveness, or slipperiness. Teflon is available in molding powder, molded pieces, dispersions in water, suspensoid, wire enamels, metal primer, lubricated paste, films, and in special combinations.

With reference to the toxicology of Teflon, Cornell (204) advises that a recent technical information bulletin on this polymer states that "minute amounts of gaseous fluorine compounds are given off at temperatures above 390° F., and appreciable quantities are given off at 600° F. or above. At approximately 750° F. polytetrafluoroethylene decomposes slowly. Adequate ventilation must be provided for any operation where these temperatures may be attained, because of possible toxicity of these gases."

Bibliography

(176) "Fluorine Elastomers, Research on Elastomers." Elastomer Research & Development Conference, United States Department of Defense, Research & Development Board, Washington, D. C., Nov. 7-8, 1950. RDB 204/1, pp. 150-52.

(177) "Reaction of Chlorotrifluoroethylene with Oxygen." Paper presented before the Division of Polymer Chemistry, A. C. S., Symposium on Chlorotrifluoroethylene.[7]

(178) "Thermal Degradation of Chlorotrifluoroethylene Polymers." Paper presented in the Symposium on Chlorotrifluoroethylene.[7]

(179) "Some Reactions of Polychlorotrifluoroethylene." Paper presented in the Symposium on Chlorotrifluoroethylene.[7]

(180) "Polymerization of Chlorotrifluoroethylene." *Ind. Eng. Chem.*, June, 1953, p. 1347.

(181) "Fractionation of Monochlorotrifluoroethylene." Paper presented in the Symposium on Chlorotrifluoroethylene.[7]

(182) "Fluorinated Elastomers, Copolymers of CF_2=$CFCl$ and CF_2=CCl_2 with Butadiene and Isoprene." Paper presented in the Symposium on Chlorotrifluoroethylene.[7]

(183) "Suspension Polymerization of Chlorotrifluoroethylene." Paper presented in the Symposium on Chlorotrifluoroethylene.[7]

(184) "Low Polymers of Chlorotrifluoroethylene." *Ind. Eng. Chem.*, Mar., 1947, p. 333.

(185) "Fluorochloroethylenes." *J. Am. Chem. Soc.*, June, 1933, p. 2231.

(186) "Fluorochloroethanes and Fluorochloroethylenes." *Ibid.*, Aug. 1934, p. 1726.

(187) "Elastomers from Fluoroprene." *Ind. Eng. Chem.*, Dec., 1948, p. 2285.

(188) "Effect of Chemicals on Fluorothene." *Ibid.*, Nov., 1950, p. 2314.

(189) "Properties of Fluorothene." Carbide & Carbon Chemicals Corp., K-25 Plant, Oak Ridge, Tenn., Atomic Energy Commission, A. E. C. D, — 2032 (Sept. 22, 1948).

(190) "Use of Perfluoro- and Chloroperfluor-Olefins in the Synthesis of Fluorocarbon Materials." Columbia University, SAM Laboratories, Atomic Energy Commission, MDDC — 1177 (1946).

(191) "Expanding Kel-F Output." India Rubber World, Aug., 1952, p. 650.

(192) "Kel-F, New Plastic, Is Shown in Chicago." *New York Times*, July 2, 1952, p. 35.

(193) "Kel-F Vessel Liner." India Rubber World, Sept., 1952, p. 787.

(194) "Teflon New 'Noble Metal' of the Plastics." *Chem. Industries*, May, 1946, p. 781.

(195) "Polytetrafluoroethylene, New Plastics Material of Exceptional Stability." *Chem. Age*, Jan., 1949, p. 10.

(196) "A New Industrial Resin." *Modern Plastics*, June, 1946, p. 134.
"Polytetrafluoroethylene." *Product Engineering*, Apr., 1947, p. 114.

(197) "High Heat and Corrosion Resistant Plastic." *Ibid.*, Nov., 1947, p. 154.

(198) "Polytetrafluoroethylene. Heat Resistant, Chemically Inert Plastic." *Ind. Eng. Chem.*, Sept., 1946, p. 870.

(199) "Acid-Resistant Heat-Stable Plastic." *Product Engineering*, May, 1946, p. 418.

(200) "Polytetrafluoroethylene." *J. Am. Chem. Soc.*, Oct., 1946, p. 2082.

(201) "Heat Resistant Resin for Industrial Uses." *Modern Plastics*, Nov., 1947, p. 108.

(202) "New Products and Materials." *Chem. Met. Eng.*, Apr., 1946, p. 145.

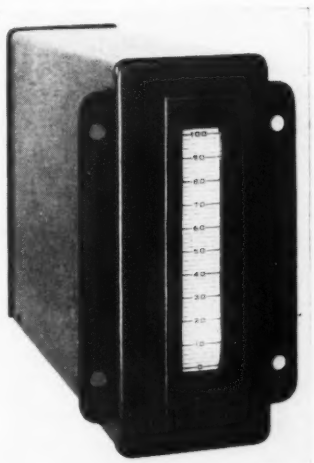
(203) "Molding and Extrusion of Teflon." India Rubber World, Apr., 1951, p. 68.

(204) "Polytetrafluoroethylene — Its Properties and Uses." Paper presented before the Rubber & Plastics Division, American Society of Mechanical Engineers, Columbus, O., Apr. 28, 1953.

(To be continued)

Ribbon-Type Indicator for Panels

A NEW ribbon-type indicating receiver, Model 50 Consotrol Indicator, which is suited to panel applications requiring the continuous indication of valve position or variables such as liquid level, has been announced by Foxboro Co., Foxboro, Mass. Pneumatically activated, the indicator applies the force received from a transmitter located at the process to a sensitive bellows which rotates lightweight drums. A brightly colored nylon tape, wound on the drums, is thus drawn behind a glass pane on which scale graduations are printed. Internal illumination is considered unnecessary since the markings are clearly defined.



Foxboro Ribbon-Type Receiver-Indicator

The indicator scale, or glass panel, measures ¾-inch by 4¼ inches. All component parts of the unit are mounted on a removable chassis and protected by a housing from which the mechanism can be removed for service without disturbing the scale, case, or panel; zero, range, and damping adjustments, therefore, are readily accessible. Available with single or dual indicating scales, the instrument can be adjusted for direct or reverse response to measurement and can be provided with alarm contacts of the mercury-switch type for warning signals.

Editorials

How Is the Future Fundamental Research on Synthetic Rubber To Be Done?

AT THE same time the editorial which appeared on this page last month entitled "What Will Be the Future of Research on Synthetic Rubber?" was prepared, letters on the same subject were written to several research directors of large and small companies in the industry and others interested in synthetic rubber research, asking their views on the matter for possible publication.

Replies or promises of replies have been received from all of these men, and we feel that the subject is of such importance that we plan to devote our editorial page for the next two or three months as a means of recording these several views in print. We believe that open discussion of this subject in India RUBBER WORLD, as well as anywhere else, may result in real benefit to the entire industry. Since some of the men requested that their names be withheld, the replies will be identified by number only.

Reply Number One from the research director of one of our large rubber companies began by referring to the quotations from Dr. H. G. Houghton, of Massachusetts Institute of Technology, also a part of the editorial:

"As pointed out in the quotation in your letter from Dr. H. C. Houghton, of M.I.T., people in general do not understand the difference between basic and applied research. As a matter of fact people who are engaged in research draw the line of demarcation at different places, depending upon their own backgrounds.

"Keeping in mind that the definition of the term is not too sharp, our own analysis of the expenditures made by the Reconstruction Finance Corp. for research in fiscal year 1952 and fiscal year 1953 develops figures which are rather interesting. In 1952 a total of $7,277,000 was expended, of which 12%, or $868,000, was for fundamental research. In 1953 the total expenditure was $6,438,000, of which 11%, or $686,000, was for fundamental study. The figures for 1953 are based on the assumption that the budget will be completely expended.

"In the fiscal year 1952, which is the only one where the complete figures are available, approximately 721,750 long tons of Government GR-S were produced. This had a market value of about 300 million dollars. You will see, therefore, that the expenditure of $868,000 for fundamental research is not a large percentage of the sales value, but only amounts to slightly over two-tenths of a percent.

"The question arises as to whether industry would do an equivalent amount of fundamental research, or whether this would have to be done by government subsidy of some sort.

"A great deal has been said and written about the undeniable fact that an insufficient amount of fundamental research has been carried on in this country. Without question, organized industrial research has gone ahead so rapidly in the past decade that the need for fundamental information is rapidly increasing without any corresponding increase in its supply. To some people the only solution has appeared to be government support; others, of which I am one, believe that there is no need or excuse for the government assuming this obligation except that taxes have become so high as to stifle the normal sources of income for the universities where most of the fundamental research has been done in the past.

"It is quite apparent that in the last few years more and more of the large industrial laboratories have been devoting a portion of their money and efforts to fundamental research. Likewise, many large industrial concerns have been lending support to the university research programs by donating sums of money for this purpose.

"It seems evident that the high tax situation must be remedied if our private enterprise system, upon which we depend for our continuously improving standard of living, is to be preserved. If such remedies take place within a reasonable length of time, I believe fundamental research in this country will increase rapidly, both in industrial laboratories and in universities. If such remedies are not applied, we will end up with the government running the industry as well as the fundamental research.

"As you are aware, Synthetic Rubber Research, sponsored by the RFC, has been rather strictly limited to polymers made from butadiene and styrene, and closely related materials. This, of course, is important for the extension of the life of our GR-S types of rubbers, but there has been ample evidence that developments along entirely different lines may, before many years, make these types of rubber obsolete. Recognition of this fact has caused industrial concerns to do a great deal of work outside of the field of interest to the RFC, and I would expect these efforts to be expanded. In the long run the fundamental studies in rubber which have been sponsored by the government are not sufficiently broad to protect the future of industry and the American people for any long period of years. There is no reason, however, why business of this magnitude cannot support an adequate fundamental research program, and I believe that, given an opportunity, industry, aided by and in cooperation with a number of the more active laboratories, will protect the future of the rubber business by an adequate amount of fundamental investigation."

R. G. Seaman

Processing of Rigid Polyvinyl Chloride Plastic[1]

C. E. Parks[2]

DURING the past 20 years, since methods for softening and processing polyvinyl chloride were first discovered, most of the research and development work has been directed toward improving and finding new applications for the soft vinyl plastics. This research has been well rewarded by greatly improved products and vastly expanded markets.

At first the major portion of production went into extrusion applications such as electrical insulation, garden hose, and gasket materials; while small amounts were used for solution coatings. After these markets became established, the industry received a new boost from the introduction of calendered thin film and upholstery cloth. This was followed, in turn, by the development of latices, plastisols, organosols, hydrosols, plastigels, lacquer resins, and low molecular weight resins for rigid applications. This continual stream of new resins, new uses, and new methods of application is the basis for the phenomenal growth of the industry.

Ten years ago a new use which consumed a few thousand pounds of resin per month would have had an important effect on the industry; today it would hardly be noticed because of the greatly increased production capacity. Therefore, if there is to be another expansion cycle such as occurred with the introduction of calendered film, new large-volume applications based on new concepts must be found which will enable vinyls to compete in large-volume markets presently outside the plastics field. The one material which offers the best opportunity at the present time is the high molecular weight rigid vinyl.

The excellent chemical properties of the rigid vinyls make them particularly desirable for those applications which present severe corrosion problems. These vinyls also offer excellent service, when exposed to strong acids and alkalies, and are often the most practical economically where very mild chemicals, such as weak acids, bases, salts, and water, and atmospheric gases cause corrosion problems. General-purpose applications for rigid vinyls will probably consume much larger volumes of plastic than those involving super-corrosive chemical service.

The physical properties of rigid vinyls make them outstanding thermoplastic materials. The general use of sheets and pipes in the construction of homes, factories, and equipment can be recommended on the basis of their beauty, permanence, and low maintenance cost.

Processing Techniques

The processing techniques discussed in this paper pertain to the high molecular weight polyvinyl chloride resins, since they are the only ones considered satisfactory for structural applications.

General Requirements

The rapid expansion of the rigid vinyl plastic market has been greatly handicapped by the general lack of processing "know-how." The natural tendency to handle the rigid vinyls like the plasticized vinyls has caused many sad experiences. It would be wise to consider the rigid vinyls as entirely new plastic materials. Although some modifications may be necessary, no special equipment or extremely high temperature, pressure, or power requirements are needed for satisfactory processing of rigid vinyls. It is true, however, that the processing conditions are more critical and that the proper procedure must be followed carefully.

Importance of Temperature Control

The most important single factor in processing rigid vinyls is temperature control. The processing temperature range is relatively narrow for every operation, and it is of paramount importance that the stock temperature be controlled within the limits of this range. If the stock is too cold, proper mixing, cohesion, and dispersion will not be obtained; if too hot, chemical changes occur which permanently damage the plastic. Heat histories are cumulative; if the virgin material is only slightly overheated, it may extrude satisfactorily the first time, but the scrap rerun may be rough.

It is impossible to set a definite temperature for each piece of equipment and consider the problem solved. Not only will the operating temperatures change when formulations are changed, but they will also vary with production rates. A large part of the heat for processing usually comes from internal friction rather than steam; therefore, stock temperature is affected by the operating speed of the equipment, Banbury pressure, and the clearances between the mill rolls or Banbury rotors.

Since the stock temperature must be controlled within

[1] Presented at a joint meeting of the Quebec Rubber & Plastics Group, Quebec Section of the Society of Plastics Engineers, Inc., and the Society of the Plastics Industry (Canada), Ltd., Montreal, P.Q., Canada, Apr. 16, 1953.

[2] B. F. Goodrich Chemical Co., Avon Lake, O.

well-defined limits regardless of the settings on the equipment, recommended steam pressures and temperatures will serve only as guides and must be corrected to suit each individual operation. A good pyrometer is a necessity, and its continuous use is recommended.

Initial Processing

Starting with the resin, it must be assumed here that the proper balance of stabilizers, fillers, and lubricants has been added in the formulation since this discussion is limited to processing equipment and conditions. Initial processing can be done either on a mill alone or on a Banbury and mill combination, with the latter procedure recommended.

Mill Mixing

It is entirely possible to mix unplasticized vinyl compounds right on the conventional mill, but this method entails several fundamental problems. The most difficult part of the operation is to get the band started because all the ingredients of the compound are dry powders, and there is little adhesive action to the mill rolls. The powder falls through as fast as it is thrown on the mill and does not get hot enough to form a sheet. If a mill must be used to start the mixing process, the best procedure is to select a small part of the batch and return it to the mill repeatedly until the band is formed. While the mill roll temperature must be high to get the band started, it becomes difficult to prevent overheating of the plastic.

Once the band is formed and is rolling in the bite of the mill, the roll temperature will rise. When the batch is taken off and new powder dropped on, the roll temperatures will drop while the sheet is being formed. The temperature of the stock should not exceed 360° F. at any time and should not roll for long periods above 345° F. If the temperature starts to rise above 345° F., the roll clearance can be increased to reduce frictional heat build-up.

Experienced operators will recognize a rough pattern developing on the mill sheet when it is being damaged by excessive heat treatment. The sheet takes on a roughened, nervy appearance. If this pattern has only begun, the stock will still be good for the initial extrusion, but may give trouble if the scrap is rerun. If heat damage has progressed too far, the compound will be off-grade. Good material will come off the mill smooth and glossy in appearance, similar to plasticized vinyl. If rigid compounds are not heat damaged in processing, they can be rerun four or five times and still be of prime quality. If the compound is processed at excessively low temperatures to avoid burning, poor dispersion, poor chemical and physical properties, and poor extrusion properties may result.

Banbury-Mill Mixing

As previously mentioned, the use of a Banbury mixer is most desirable, and almost essential, as the first step in processing rigid vinyl. The Banbury confines the dry, free-flowing powders under controlled temperature and pressure conditions so that the stock is mixed and brought up to milling temperatures before being placed on the mill. The Banbury performs only a preliminary mixing operation. Experience has shown that, following Banbury mixing, milling should be performed with differential speed rolls at a close clearance to obtain good dispersion.

Instead of the glossy mass formed by plasticized or low molecular weight rigid vinyls in the Banbury, high molecular weight rigid vinyls give a rough, crumbly mixture of material. Higher temperatures will cause some agglomeration, but a glossy, cohesive mass will not be formed no matter how high the temperature. Experience has shown that such large agglomerates are not desirable because they make the subsequent milling more difficult. Even at the Banbury dropping temperature the compound is too stiff to flow under its own weight; therefore, it cannot be picked up in the bite of the mill rolls. If large chunks are formed, they will ride on top of the mill and hinder the formation of the initial sheet.

It is recommended that the Banbury dropping temperature be lowered until the material falls out in small crumbs which can be picked up immediately by the mill. Contrary to what might be expected, the plastic in this condition will form a sheet on the first pass through the mill, with very little fall-through, so that milling is not a problem. After a few passes on the mill a smooth, continuous sheet is formed which can be as easily cut and rolled as a plasticized vinyl compound.

The temperature inside the Banbury is usually indicated by a recording pyrometer, but it is very important that this reading be not taken as the stock temperature. If the cycle is very short, the stock temperature may be as much as 75° F. higher than indicated by the pyrometer, and the stock may overheat without the operator being aware. At the start of the run it is necessary that batches be dropped at different temperatures by the pyrometer, and the actual stock temperatures taken with a needle pyrometer. After sufficient evidence is obtained to establish the differential between the stock temperature and the Banbury pyrometer reading, production can be satisfactorily controlled with the recording pyrometer.

Post-Banbury Milling

Mill roll temperatures must be adjusted to the compound and equipment, and the roll speeds, differential ratio, and clearance are the determining factors. The amount and the type of loading and lubrication of the compound must also be considered. When running a calendering stock, which has a small amount of lubricant, the mill temperatures may have to be lowered appreciably. Running the back roll cooler than the front roll helps to keep the stock on the front roll and reduces frictional heat. The optimum stock temperature during milling is about 345° F., and any necessary adjustments should be made during production to maintain this temperature.

Milling time varies greatly with the equipment being used. If a mill of proper size is used with the Banbury, an overall cycle of 10 minutes should be maintained easily. No real milling is done until the stock is hot, sticking tightly to the rolls, and rolling in the bite of the mill. The sheet should be cut continuously so that the whole batch is passing through the mill (see Figure 1).

Obviously, an overloaded mill is inefficient, takes a longer cycle, and may produce a mass that is nonuniform, poorly dispersed, and difficult to extrude. The batch size going on to the mill after Banbury mixing should be no larger than would be milled if the Banbury were not used. Sufficient milling is indicated by the sheet becoming smooth, glossy, and strong.

Granulating and Cubing

Milled sheets of the rigid plastic can be cut into small pieces in either standard granulators or cubers. A partially cooled strip can be fed satisfactorily through either machine, and cold plastic in small squares can be broken up in a conventional heavy-duty granulator. Uniform cubes with no "fines" are to be preferred.

Extrusion

Conditions for extrusion can be given only in general terms because they will vary with different compounds and equipment. Figure 2 shows a typical extrusion set-up. When starting with cold granules, it is necessary to get them up to the plastic temperature as quickly as possible. Temperatures along the extruder barrel should be about 320° F. near the feed box, then 330, 350, 330, and, finally, 360 F. at the die. Screw temperature may vary from the same to somewhat lower than the stock temperature. Screw speed should be relatively low and adjusted for maximum delivery rate.

No special type of extruder or screw has been found necessary; both single- and double-screw machines seem to work equally well. A single-screw machine having a single flight, constant pitch, decreasing depth screw with a compression ratio of about 1.5:1 is believed to be a good general-purpose unit. A long land die designed to give high compression after the breaker plate or spider is desirable.

Special take-up equipment is necessary for any type of rigid extrusion. The extruded shape must be held in the desired position until it cools. A conveyor belt with weighted rollers to create sufficient traction is commonly used to pull the extrusion through sizing equipment and water bath. This take-up equipment can be discussed only in very general terms because it must be designed specifically for each job.

Fig. 1. Milling of Rigid Vinyl Requires Continuous Cutting of the Sheet to Insure Proper Mixing

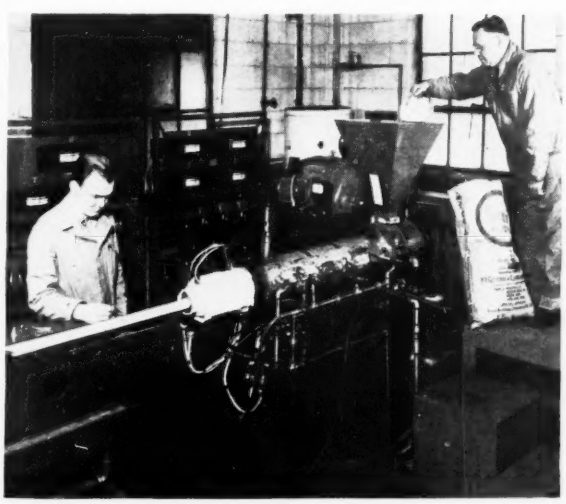


Fig. 2. Typical Set-up for Extruding Rigid Vinyl Pipe; Processing Bath Equipment Has Been Removed to Facilitate Photographing

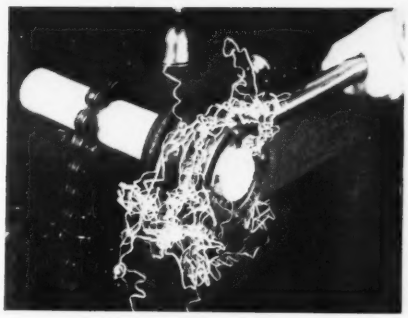


Fig. 3. Extruded Rigid Vinyl Pipe Is Readily Threaded by Standard Pipe Dies

Fig. 4. Rigid Vinyl Part Being Removed from a Press; The Hot Sheet Has Been Drawn in the Unheated Press, Allowed to Cool in the Mold, and Is Rigid When Removed

Calendering

A #3-A Banbury, two 84-inch mills, a 66-inch four-roll calender, and suitable take-up equipment form a satisfactory processing train for calendering operations. The #3-A Banbury can turn out a 175-pound batch about every five to six minutes, and these batches can be fed alternately to the 84-inch mills which will require about 10 minutes per batch. The mill batches can then be fed alternately to the calender. This type of set-up will have a capacity of about 2,000 pounds of calendered sheet per hour.

The stock can be cut from the mill, rolled into "pigs," and fed to the calender in the conventional manner. The calender rolls should be at a temperature of about 310-335° F., set to operate with small rolling banks, and operate at speeds somewhat lower than those used for plasticized vinyls. Sheet widths up to 54 inches should be obtained without difficulty on a 66-inch calender. Sheet thicknesses of 0.008-0.030-inch have been run successfully on this-size equipment.

Molding

Experience to date indicates that the fundamental flow properties of unplasticized high molecular weight vinyl resins are such that injection molding of the conventional type is impossible. These materials are very dry, tough, and highly viscous even at very high tempera-

tures. When heated in a static condition, the resins soften progressively until a temperature of 350-360° F. is reached, but even then are not in proper flowing condition. Increasing the temperature still further will cause internal chemical reaction (probably cross-linking) and decomposition, but will not appreciably increase the flow properties.

Rigid vinyls are apparently somewhat thixotropic, and their viscosity can best be reduced by efficient agitation. Such agitation can be accomplished by the conventional extruder. An extruded rod, cut to proper length while still hot (360° F.) and placed in a transfer mold with minimum loss of time, exhibits the best flow properties and makes the strongest molding of any method tried to date.

Sheet Laminating

Calendered or milled sheets of rigid polyvinyl chloride can be laminated to build up thicknesses for structural applications. Sheets up to one inch thick can be made by direct heating in a press, but the poor heat transfer properties of the material make it difficult to build up greater thicknesses. Temperatures of 350-360° F. and pressures of 400-600 psi. are desirable for good laminating.

Fabrication

Rigid polyvinyl chloride can be worked or fabricated satisfactorily by practically all machine tools used for wood and metal (see Figure 3). Being a thermoplastic material it can also be bent, deep drawn (see Figure 4), vacuum molded, blow molded, and welded. This extreme versatility makes it a very valuable structural material, but much still must be learned about its fabrication techniques.

The metal industries have invented and developed many automatic machines which can make almost anything at very high production rates. Similar machines must be developed to handle rigid vinyl to keep fabrication costs down. This need is one of the greatest at present to make general applications of the plastic more economical.

Applications and Consumption

While the use of rigid vinyl plastics in structural applications is very new, a number of other uses are fairly common. The principal uses, thus far, have been chemical processing equipment; pipe; duct work; advertising signs and displays; containers, tote boxes, and trays; and electrical applications.

We estimate that the total consumption of rigid vinyl last year was 10,000,000-15,000,000 pounds. Most of this total was used as calendered film or laminated sheet, with the remainder going into pipe and tubes. The potential volume of rigid vinyl plastics is estimated by most authorities to be in the neighborhood of 100,000,000 pounds per year.

Meetings and Reports

ASTM Committee D-20 on Plastics Holds Annual Meeting

COMMITTEE D-20 on Plastics of the American Society for Testing Materials met on June 30-July 2 as part of the Society's fifty-sixth annual meeting on June 28-July 3 at Chalfonte-Haddon Hall, Atlantic City, N. J. Approximately 55 members and other interested persons attended the D-20 meeting, which consisted of section meetings on June 30; subcommittee meetings on July 1 and the morning of July 2; and a special afternoon papers session on July 2 in conjunction with Committee D-9 on Electrical Insulating Materials. Chairman R. K. Witt, Johns Hopkins University, presided over the D-20 sessions and was assisted by Secretary G. M. Armstrong, Tennessee Eastman Co.

Committee D-20 Meeting

The full committee meeting was held at the close of the July 2 morning session, with 45 members present. Mr. Armstrong reported on the advisory committee meeting held the previous evening. Committee D-23 has requested that Method D817, on Acetyl and Butyryl Content of Cellulose Acetate Butyrate, be placed under its jurisdiction instead of D-20. It was decided to make the method a joint specification of D-20 and D-23.

Requests have been received for the preparation of specifications covering glass reinforced laminated tubes and pipe, vinyl pipe, and plastic coatings. These matters are being referred to the appropriate subcommittee (6). Mr. Armstrong requested all subcommittee and section chairmen to submit up-to-date membership lists for inclusion in the next Yearbook of the Society. The advisory committee also ruled that section members be given at least two weeks' notice in advance of meetings.

Dr. Witt announced that D-20 will hold its fall meeting on September 28-30 at Chalfonte-Haddon Hall, in conjunction with the Committee D-9 meeting on September 30-October 2. The Spring, 1954, meeting will be held in the Roanoke Hotel, Roanoke, Va., during the third week in March.

Joint D-20, D-9 Session

Reports on the activities of D-20 and D-9 were presented by the respective chairmen, Dr. Witt and A. H. Scott, National Bureau of Standards, at the joint session on the afternoon of July 2, presided over by G. H. Kline, also of NBS. The following two papers were also given:

"Determination of Elastic Constants of Orthotropic Materials with Special Reference to Laminates," Dr. Witt, W. H. Hoppmann, II, and R. S. Buxbaum, all of Johns Hopkins. Both the theoretical basis and an experimental method were described for determining the anisotropic elastic constants of a material by measuring deflections of a thin plate of the material subject to couples on its boundary. By use of the method elastic constants were determined for the following three laminates: a glass-base melamine resin, a paper-base melamine resin, and a glass-base silicone resin.

"Three Years' Outdoor Weather Aging of Plastics under Various Climatological Conditions," S. E. Yustein and R. R. Winans, both of the Brooklyn Naval Shipyard, and H. J. Stark, Navy Bureau of Ships. The effects of outdoor weather aging on various types of plastics were investigated under the following five different climatological regions: (1) New Mexico (dry desert); (2) Panama Canal Zone (tropical); (3) New York (temperate); (4) Fort Churchill, Canada (subarctic); and (5) Point Barrow, Alaska (arctic). The materials investigated included five types of clear, transparent sheet plastics; six types of laminated materials; and five types of molded terminal bars. Various exposure periods from 1-36 months were employed, and the different mechanical, electrical, and optical properties evaluated.

Subcommittee Meetings

Subcommittee 1—Strength Properties. R. M. Berg, Carbide & Carbon Chemicals Co., chairman. F. E. Willard, Ohio-Apex, Inc., acted as chairman in the absence of Mr. Berg. Two round-robin testing programs on rigid and non-rigid films have shown the need of a revision of D882-49T, Tensile Properties of Thin Plastic Sheets and Films. Work is under way on this revision, which will cover three methods: static weighing-constant separation, pendulum weighing-constant motion, and moving weighing-constant inclination. The method of static weighing-variable separation will be deleted in the proposed revision. Work on a stiffness test by the new Section L is under way. Section O on dynamic properties has a round-robin test in process. Section M on tear strength is awaiting further information on the NBS test program. A new chairman is to be ap-

pointed for Section B on impact strength.

Subcommittee 2—Hardness Properties. H. L. McChesney, Monsanto Chemical Co., chairman. Section A, on indentation hardness, is awaiting receipt of the British Admiralty test method, as well as the Brooklyn Navy Yard report comparing the Admiralty, Rex, and Pusey & Jones testers on vinyl, polyethylene, GR-S, and gum rubber. The proposed revision to D1044-49T, Resistance (Optical Effects) of Transparent Plastics to Surface Abrasion, will be sent to letter ballot of the subcommittee in the near future.

Subcommittee 3—Thermal Properties. C. H. Adams, Monsanto, chairman. M. M. Braidech, National Board of Fire Underwriters, has been appointed chairman of Section C (flammability). Section D, flow of thermoplastics, considers the SPE inclined plate flow test too rough for specification use and is working on the parallel plate plastometer test for film as a proposed method. A test procedure for determining the second-order transition temperature is needed, and the method used by B. F. Goodrich Chemical Co. as well as other methods will be investigated. Section E, effects of heat, is setting up a round-robin test to determine the effects of annealing of polystyrene on heat distortion temperature. Section F, flow of thermosetting materials, has completed a letter ballot of the subcommittee on the proposed method for determining the molding index of thermoset powders. Negative votes are being considered, and the method will be reballoted after revision to indicate that the test gives a factor rather than the molding index itself. Section F is also conducting a round-robin test program on plunger molding. Section H, brittleness temperature, agreed to a revision of D746-52T (Method of Test for Brittleness Temperature of Plastics and Elastomers by Impact) to permit use of the method by the rubber and the automotive industries as an acceptance test on a go-no go basis. This revision is being sent to simultaneous letter ballot of the subcommittee and D-20.

Subcommittee 4—Optical Properties. H. K. Hammond, III, NBS, chairman. Section A, color, reported that work being done by Committee D-1 on Paint, Varnish, Lacquer, and Related Products is expected to culminate in 6-12 months in a test method for determining color differences. Section B, on haze, is currently inactive and acting only as a clearing house for complaints. The other sections are also inactive.

Subcommittee 5—Permanence. J. W. Mighton, Dow Chemical Co., chairman. The proposed revision of D570-42, Method of Test for Water Absorption of Plastics, has passed subcommittee ballot and is being sent to D-20 ballot. Section F, shrinkage, will investigate the effect of specimen shape on shrinkage. A new chairman is needed for Section G, gas permeability. R. J. Ettinger, Goodrich Chemical, has been appointed chairman of Section A, effect of light.

Subcommittee 6—Specifications. Lucius Gilman, Picatinny Arsenal, chairman. Dr. Witt acted as chairman in the absence of Mr. Gilman. The proposed specification for laminated thermoset decorative sheets has passed D-20 ballot and is being sent to the standards committee. Revisions are being prepared of the specifications on urea-formaldehyde molding compounds, cast methacrylate, and polystyrene molding compounds. A new specification on rubber-modified phenolics is in preparation. Work is in progress on a classification system for non-rigid plastics and a revision of D1249-52T (primary octyl phthalate ester plasticizers). Section U is being organized to work on halocarbon plastics.

Subcommittee 7—Analytical Methods. H. E. Riley, Bakelite Co., chairman. Methods for determining total chlorine, volatile content, and particle size of vinyl chloride polymers are being completed and will be sent to subcommittee ballot. Methods of determining ionic soluble content and oil absorption of vinyl resins are being studied. A round-robin testing program on thermal stability of plasticizers is expected to get under way shortly.

Subcommittee 9—Molds and Molding. J. L. Williams, Dow, chairman. Section D is conducting a round-robin test of transfer molds for molding specimens. G. D. Johnson, Durez Plastics & Chemicals, Inc., is the new chairman of Section E (molding conditions and properties), which is studying the need of a new mold shrinkage test specimen. Section H (molds for injection molded test specimens) is being reactivated under a new chairman (to be appointed) to investigate the need of standardizing test specimens, particularly with modified styrenes. A recommendation will be made to D-9 to drop method D551-41, on mold shrinkage, in favor of D955-51.

Subcommittee 10—Definitions. C. H. Alexander, Goodrich Chemical, chairman. Section A will handle only definitions; while nomenclature will be covered by a new Section E. New definitions, to be sent to D-20 ballot for inclusion in D883, have been approved by Section A and the subcommittee for the terms "A-stage," "B-stage," "C-stage," "envenomation," "plasticizer," "reinforced plastics," "filler," and "non-rigid plastics." Section E will revise the title of D675-45 to read "Standard Nomenclature of Descriptive Terms Relating to Plastics." Further proposed revisions of D675 are awaited from Subcommittee IV.

Subcommittee 14 — Conditioning (Joint with Committee D-9). A. C. Webber, E. I. du Pont de Nemours & Co., Inc., chairman. Section A (general conditioning methods) has completed a letter ballot of D-20 on the proposed revision of D618-51T. An editorial change is being made in this revision to permit use of a shorter conditioning time provided substantial equilibrium is reached. The possible use of conditioning cabinets, in addition to calcium chloride desiccators, for cooling down conditioned specimens will be investigated. Section B, on maintenance and measurement of humidity, is investigating methods of measuring humidity in small spaces or at high humidities.

SPE Sections News

Plastics Vocational Course

AN EDUCATIONAL program carried on by the New York Section, Society of Plastics Engineers, Inc., has resulted in the establishment of a specialized course on plastics this September at the Machine & Metal Trades Vocational High School in New York, N. Y. Open to selected senior-year students, the course will cover plastics manufacture, including raw materials, molding methods, and fabrication techniques. The Section cooperated with the New York City Board of Education to organize the course and prepare the curriculum. This work was conducted by the Plastics Education Commission of the Advisory Board for Vocational & Extension Education. H. H. Schwartz, Empire Brushes, Inc., and vice president of the Section, is chairman of the Commission and is assisted by R. M. Thews, Monsanto Chemical Co.

During the past school year the Commission's special publicity committee conducted plastics information forums for the guidance counselors and students of the city's elementary and junior high schools. Leading this committee were H. J. Weber, Rotuba Extruders, Inc., and William Lewi, Dusal Tool & Mold Co., Inc. The Section has conducted an extensive survey of the plastics industry in the Greater New York area to show the enormity of the industry and the excellent employment possibilities for vocational course graduates. In addition, the Section has gathered equipment valued at more than $5,000 for the course, installed the equipment, and is now collecting funds for maintaining and increasing the stock of equipment. B. E. Wessinger, Wess Plastic Molds, Inc., is in charge of equipment and installation, and the fund raising program is headed by G. P. Humphrey, R. C. Molding, Inc. The new course is expected to be the forerunner of the first plastics vocational high school to be established in the City of New York.

Motion Picture Contest

The New York Section has also announced a movie contest in which 8- or 16-millimeter silent films on any phase of the plastics industry will be judged with an eye for using them for the New York Plastic Vocational High School courses. The contest is open only to Section members, and the length of the film cannot exceed 10 minutes. Judges are George Kleber, technical assistant-advisory board for Vocational & Extension Education, Board of Education of the City of New York; Stanley Bindman, Jamison Plastic Corp.; and Islyn Thomas, Thomas Mfg. Co. Three prizes, of $50 and $25 savings bonds, and a one-year free membership in SPE, will be awarded.

Golf Outing at Chicago

The Chicago Section of the Society of Plastics Engineers, and the Midwest Chapter of the Society of Plastics Industry held a combined golf outing at Nippersink Manor, Genoa City, Wis., on June 18, 19, and 20. More than 50 members and guests attended the three-day affair, at which prizes worth more than $500 in retail value were awarded to the golfers. The principal winners were J. Van Nortwick and Jay Gaines, Catlin Corp. Chairman of the outing committee was Warren Cooper, Tennessee Eastman Corp., assisted by Maurice Meltzer, Service Plastics Co.

Changes Vinylite to Krene

Bakelite Co., division of Union Carbide & Carbon Corp., New York, N. Y., has announced a change from the trade mark, Vinylite, to the trade mark, Krene, on all calendered plasticized polyvinyl chloride film and sheeting manufactured by the company. The change has been made in an attempt to avoid confusion between numerous adaptations of the term vinyl that has resulted from the large use of vinyl materials for consumer products. Bakelite is planning to launch a large-scale advertising program, through trade papers and consumer magazines, to acquaint customers with this change.

Scientific and Technical Activities

Rubber Division, A. C. S., Chicago Meeting, Includes Goodyear Medal Award

THE sixty-fourth meeting of the Division of Rubber Chemistry of the American Chemical Society will be held in Chicago, Ill., September 9 through 11, as a part of the one hundred and twenty-fourth national meeting of the parent Society. The Rubber Division will have its headquarters at the Hotel Sherman and will hold all its major events there.

This meeting will be featured by the presentation of the Goodyear Medal to John T. Blake, Simplex Wire & Cable Co., and many other special events have been planned by the local committee on arrangements, headed by Herman Boxser, Acadia Synthetic Products Division of Western Felt Works.

The technical program consists of 21 papers to be presented in three separate sessions beginning on Wednesday afternoon, September 9, and continuing on Thursday and Friday mornings. Seward G. Byam, E. I. du Pont de Nemours & Co., Inc., will open the meeting and preside at the first session. A. M. Neal, also of du Pont, will preside at the Thursday morning session, and A. E. Laurence, Phillips Chemical Co., will preside at the session on Friday morning. Insofar as possible, the papers presented at each of these sessions have been grouped according to similar or related subjects. The papers at the Wednesday afternoon session are concerned with carbon black and other rubber reinforcing agents and with methods of analysis. The Thursday morning session deals with vulcanization mechanisms, compounding, new rubber-resin blends, and foamed sponge rubber. The final session on Friday morning includes papers on polymerization techniques for butadiene-styrene rubbers and more information on chlorosulfonated polyethylene.

A regular luncheon-meeting of the Division's 25-Year Club will be held on Wednesday, and the Division banquet on Thursday evening will be preceded by the cooperative suppliers' cocktail party. Plant trips scheduled for Thursday afternoon include visits to the Chicago Stockyards, International Harvester Co., and the Museum of Science & Industry, as well as visits to one or two rubber plants in the Chicago area.

The Charles Goodyear Medal Award Address will be given by Dr. Blake following the technical session on Thursday morning. His subject will be "The Future of Rubber." The Goodyear Medal will be presented during the Division banquet at the Hotel Sherman on the same evening by Mr. Byam. Division Vice Chairman, J. C. Walton, Boston Woven Hose & Rubber Co., will talk on "John T. Blake, the Man," during the Medal Award ceremonies.

A special program for the ladies attending the meeting is also being prepared and will include a fashion show at Marshall Field & Co. and a dinner party with a miniature operetta at the famous Kungsholm's Restaurant.

S. M. Lillis, Victor Mfg. & Gasket Co., is assistant chairman of the local arrangements committee. Chairmen of the various subcommittees are: housing and hotel arrangements, J. Sheridan, N. J. Zinc Co., and W. H. Ayscue, du Pont; registration, Maurice O'Connor, O'Connor & Choate; technical program arrangements, Bruce Hubbard, Ideal Roller & Mfg. Co.; banquet and entertainment, Francis Frost, Frost Rubber Works; suppliers' cocktail party, Charles Baldwin, United Carbon Co.; publicity, L. W. Heide and Bert Vandermar, Western Felt Works; finance, A. Robinson, Harwick Standard Chemical Co.; plant visits, Howard Andersen, B. F. Goodrich Chemical Co., and Ralph Anschuetz, Witco Chemical Co.; ladies' program, John Groot, Dryden Rubber Division, Sheller Mfg. Corp., and Mr. Laurence; and 25-Year Club Meeting chairman, H. A. Winkelmann, Dryden.

Abstracts of the papers to be presented at the technical sessions, their authors (with name of man reading the paper, in bold face), and their company affiliations follow:

WEDNESDAY AFTERNOON—SEPTEMBER 9

SEWARD G. BYAM, PRESIDING

2:00 p.m.—1. **Introductory Remarks. Seward G. Byam.**

2:10 p.m.—2. **Flame Photometric Determination of Rubber Solids Deposited on Cords and Fabrics.** H. E. Todd and **H. M. Tramutt,** Gates Rubber Co., Denver, Colo.

During the past decade there has been a great transition in the rubber industry from cotton to synthetic fibers, such as rayon, nylon, Dacron, and Fiberglas, and also from natural rubber to the many synthetic latices, such as the GR-S types, BAC (du Pont), and Gen-Tac (vinyl pyridine copolymers and terpolymers). With this change it has become increasingly important to study these component materials in relation to economy, quality, uniformity, and product service.

To reinforce rubber products, such as tires, belts, and hose, with these cords and fabrics, it is necessary to have good adhesion of the fibers to the rubber. This adhesion is obtained by pretreatment of cords and fabrics with suitable latex-based formulations. In our research studies we have found that the best way to follow and obtain consistently this adhesion is by the determination of the percentage of latex solids picked up or % SPU. As a result of this program we have drawn up production specifications for controlling solids pick-up on all cords and fabrics used in the manufacture of tires and mechanical goods.

Various methods for measuring % SPU, both mechanical and chemical, that are used in the industry were evaluated. The advantages and disadvantages of each of these are discussed. Since these methods were not found entirely suitable for our overall production and development requirements, a flame photometric method was developed in our laboratory. This method was evaluated on cotton, rayon, nylon, Fiberglas, and Dacron, using natural rubber, GR-S, and other special-type latices. The method is based upon following the sodium contents in the system.

The results of this study show that the described method is applicable for all cords and fabrics and any latex formulation containing sodium. This method has been employed in our production and development work and has been found satisfactory from the standpoint of speed, accuracy, and scope.

2:30 p.m.—3. **A Tracer Method for Sulfur Solubility in Rubber. I. Auerbach** and S. D. Gehman, Goodyear Tire & Rubber Co., Akron, O.

Sulfur solubility determinations for rubber have heretofore been limited almost entirely to specimens of reasonable optical clarity as they have depended on the observation of the occurrence of sulfur crystals. A method which can be used readily with opaque compounds is especially desirable for studying the effect of compounding ingredients on sulfur solubility.

A new method has been devised for measuring sulfur solubility which employs the radioactive S-35 isotope. The rubber specimen is prepared in the form of a small disk, 0.75-inch diameter and about 0.03-inch thick. This is clamped in a stainless steel cell over a thin layer of sulfur powder tagged with S-35. The rubber is thick enough to absorb all the beta radiation so that there is no count above background when the cell is brought under a G-M end window counting tube. The cell is closed and placed into a constant temperature oven. Sulfur diffuses into the rubber and reaches an equilibrium concentration corresponding to its solubility at the storage temperature. The attainment of this equilibrium concentration is indicated by a constant counting rate when the cell is removed from the oven at various time intervals, opened, and placed under the G-M tube. The sulfur solubility can be determined from the equilibrium counting rate by means of a suitable calibration curve.

Migration of sulfur to the surface, or blooming, can be followed by changes in the counting rate when a specimen is stored at a lower temperature after the solubility determination. The results for sulfur solubility in GR-S and natural rubber are compared with those secured by other methods and found to be consistent with some of these determinations. The effect of a number of commonly used compounding ingredients, including carbon black, on apparent sulfur solubility was measured, and illustrative results are included. The method should be applicable also for measuring the solubility in rubber of compounds tagged with S-35 or C-14.

2:55 p.m.—4. **The Effect of Heat Treatment on the Reinforcing Properties of Carbon Black.** W. D. Schaeffer and **W. R. Smith,** Godfrey L. Cabot, Inc., Boston, Mass.

The present study was undertaken in an effort to define the relative importance of particle size and surface activity in rubber reinforcement. Previous studies have indicated that heat treatment of carbon black over the temperature range 1000 to 2700° C. progressively decreases surface activity, as judged from heats of adsorption of gaseous absorbates. During this heat treatment particle size is not significantly altered.

A series of commercial carbon blacks, ranging from fully reinforcing HAF to essentially non-reinforcing FT blacks, was progressively heat-treated in an induction furnace from 1000 to 2700° C. Electron microscope, surface area, and X-ray diffraction data were collected on all samples.

The samples were compounded in a natural rubber tread stock recipe, and complete evaluation of the vulcanizates was carried out. The most striking effect noted was a marked decrease in modulus of the stocks

with heat treatment. Although in some instances the modulus of the gum stock was approached, the angle abrasion values were not drastically reduced.

The rubber properties of the finer particle size blacks displayed a more marked response to heat treatment than the coarser blacks.

3:20 p.m.—5. **The Adsorption of Iodine and Bromine by Carbon Black.** J. W. Watson and **D. Parkinson,** Dunlop Rubber Co., Ltd., Birmingham, England.

The adsorption of iodine by a number of reinforcing carbon blacks is shown to depend upon the solvent, the temperature, and the free iodine concentration. It is found that the surface areas of blacks cannot be directly related to the adsorption of iodine from solution. The relation between the type of isotherm and the volatile content of the black is discussed.

Desorption of the iodine from a channel black shows that no chemisorption takes place; adsorption hysteresis is due to what is here termed "activated physical adsorption."

More pronounced hysteresis is obtained when bromine is used in place of iodine. Part of this hysteresis is caused by a substitution reaction (hydrobromic acid being liberated), and the remainder appears to be an addition reaction.

The bromination of a reinforcing black is found to have no effect on its reinforcing properties. It is concluded, on the assumption that the brominated black is saturated, that unsaturation in carbon blacks is not a factor in rubber reinforcement.

3:45 p.m.—6. **Extrusion Factors of Black Rubber Compounds. I. Drogin,** H. R. Bishop, P. Wiseman, United Carbon Co., Charleston, West Va.

Extrusion requirements are dictated by the nature of the compound and the size and the shape of the desired extrusion. In extruded goods, such as treads, tubes, weatherstripping, etc., uniformity of extrusion is of paramount importance. The stock must run uniformly in the existing dies and always remain true to gage. Other requirements stressed are high extrusion speed to achieve maximum volume of production, constant weight per unit length, stock distribution, regular shrinkage (or swell), smoothness (some roughness is permissible in the case of treads), and nonporosity.

The requirements for extruded industrial mechanical rubber goods having a wide range of Shore hardness are even more critical. They call for the compounds to extrude the same way all the time, especially through the intricate shaped dies of restricted area. The extruded sections must retain their shape, be of consistent gage, and adhere to the proper dimensions and to the limits of tolerance. They should expand uniformly from the die and be characterized by dimensional stability, sufficient raw rigidity, smooth surface and edges, uniform plasticity, reduced inherent nerve, and possess the same scorch rate.

Extrusion properties are governed by the type of rubber used, its degree of breakdown, the amount and the type of physical or chemical softeners incorporated in the compound, the quantity and the type of pigment loading, and the uniformity of dispersion, mixing temperature, mixing cycle, remilling, compound Mooney viscosity (or plasticity), scorch rate, condition and the form of the material supplied to the extruder, aging of stocks before extrusion, temperature of the stock delivered to the extruder and extruded from the die, type and style of die and head used, and the temperature conditions in the extruder.

Carbon blacks are characterized by different extrusion properties, and some differences may even exist in carbon blacks of the same type. The extrusion properties of SAF, HAF, EPC, FEF, MAF, FF, HMF, GPF, SRF, and MT types of carbon blacks in various rubbers are shown here. Included are the effects of varying amounts of peptizer and softeners; carbon black loadings ranging from 45 to 55 parts per 100 of RHC in a tread-type compound, and higher loadings in industrial mechanical rubber goods; blends of carbon black; shorter mixing cycles; remilling; mixing at high temperature; extruding at different temperatures and various speeds; and "backing" the die. The effects of these measures on processing, extrusion, and reinforcement are noted.

4:15 p.m.—7. **Experimental Blacks for Rubber Compounds. A. G. Cobbe,** M. Polley, and J. S. Boyd, Cabot Carbon Co., Pampa, Tex.

A series of experimental oil furnace blacks was prepared and tested in natural and synthetic rubbers. The particle size, as determined by electron microscope and nitrogen surface area determinations, characterized these blacks as being finer than presently available commercial furnace blacks. The reinforcing ability of these blacks did not increase to the extent expected on the basis of the particle size measurements. The paper will discuss the possibility that current techniques of dispersion do not utilize fully the surface area available with these blacks.

4:35 p.m.—8. **The Effect of Various Surface Treatments on the Reinforcement and Rate of Cure of Silica-Loaded Stocks. Walter R. Hausch,** Firestone Tire & Rubber Co., Akron.

The work of Thies showed that the dye adsorption of various clays was a good indication of the reinforcement to be expected from them in rubber stocks. In the course of this work it was found that the colloidal silicas have even higher dye adsorption. This is reflected in high accelerator adsorption and consequently starved cures.

It was found that dye adsorption could be reduced and reinforcement increased by heating the silica at elevated temperatures. Optimum temperatures for heating to improve reinforcement were from 600 to 800° F. The dye adsorption and the tensile properties of a silica-loaded stock were used in the determination of this optimum. These results correlated very well with published data for the surface area and heat of wetting of heated silicas.

Various glycols added to colloidal silica also reduced accelerator adsorption and gave tighter cures. Dipropylene glycol imparted greater reinforcement to the silica-loaded stocks than any of the glycols tested. Heptanediol-2,4 improved reinforcement to almost the same extent. The improvement may be due to the molecular structure of these compounds.

The combined effects of heat treatment and glycol or amine addition resulted in greater reinforcement at shorter curing times and with lower accelerator requirements.

THURSDAY MORNING—SEPTEMBER 10

A. E. NEAL, PRESIDING

9:00 a.m.—9. **Vulcanization Characteristics of a Series of 4-Methyl-5-Substituted 2-Thiazolethiols and Their Derivatives. J. J. D'Amico,** K. E. Creed, Jr., M. W. Harman, R. O. Zerbe, Monsanto Chemical Co., Nitro, West Va.

The trend toward the more scorchy furnace blacks has brought about increased scorch problems for which the conventional accelerators appear to offer only a partial solution. The economic considerations have limited the search for more delayed action products, in the past, to the relatively cheap 2-mercaptobenzothiazole derivatives. Today, however, the ever-rising cost of aromatics makes the evaluation of aliphatic-type materials, such as the 4-methyl-5-substituted 2-thiazolethiols, potentially more attractive.

An extensive study has been made on this series of compounds and their derivatives with the view of obtaining stable materials which would provide the desired delayed-action properties. Of these, the thiazolesulfenamides prepared by the oxidative condensation of 5-carbethoxy-4-methyl-2-thiazolethiol with morpholine and certain primary amines gave more delayed action than commercial accelerators with equal or better physical, aging, flexing, and heat build-up characteristics.

Data demonstrating the above-mentioned physical properties are given for a series of 5-carboalkoxy-4-methyl-2-thiazolesulfenamides in *Hevea* and GR-S tread stocks. The synthesis of a number of these new compounds is described along with the other derivatives.

9:20 a.m.—10. **Compounding with Lignin and Humic Acid. F. J. Tibenham,** Dunlop Rubber, and N. S. Grace, Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., Canada.

A considerable amount of work has been conducted on compounding rubber with lignin in both the United States and United Kingdom in view of its potential abundance and low cost and its promise as a high-performance compounding ingredient. The hitherto anticipated good results have not been consistently achieved, and reasons for this fact are discussed.

Methods employed to improve lignin-rubber compounds are described, involving modifications to the lignin itself, to the curing system, and to processing techniques. The use of lignin in combination with furnace black is also examined.

Like lignin, humic acid is also available from a cheap natural source and has potentially interesting properties as a compounding ingredient. The parallelism between the behavior of humic acid and lignin is discussed in the light of the similarity of their constitutions.

9:40 a.m.—11. **Mechanism of Vulcanization of Polysulfide Rubber. E. M. Fettes,** J. R. Panek, J. S. Jorczak, Thiokol Chemical Corp., Trenton, N. J.

Although polysulfide elastomers such as Thiokol Type FA have been vulcanized for years by empirical methods, the mechanism has been unknown. A clear understanding of the vulcanization process can only be attained by a knowledge of the chemical reactions taking place in the cure.

The experimental study deals specifically with the class of polysulfide polymers such as Thiokol Type FA which are heat cured with zinc oxide. The usual compound contains also benzothiazyl disulfide and diphenylguanidine. The effect of omission of any and all of these materials is studied as well as the effect of amount of zinc oxide and replacement by other zinc salts and metallic oxides. The effect of diisocyanates is also studied.

This investigation has shown that the chain ends are not thiol groups, but probably hydroxyl groups caused by very slight alkaline hydrolysis of the halide groups of the monomer in the polymerization. It has also been shown that zinc oxide both removes the effect of the peptizing agent and causes coupling of chain ends.

10:05 a.m.—12. **A New, Unvulcanized Composition of Resin and Rubber**

Having Unusual Toughness. H. S. Sell and **R. J. McCutcheon,** Goodyear.

The rubber and the plastics industries are showing increasing interest in thermoplastic compounding materials having high impact strength, high softening temperatures, and a range of flexibility and rigidity. Efforts have been made to achieve these qualities through blends of resins and elastomers. Cured blends, requiring curing cycles and disposition of cured scrap, have obvious disadvantages, and uncured blends having all the desired properties are few indeed. To date, only one blend, that of styrene-acrylonitrile resin and nitrile rubber, is of commercial importance.

Recently another blend of a resin and an elastomer was developed which requires no cure and which has several outstanding properties. This blend combines a new type of styrene resin (Pliotuf XG85C) and a chloroprene rubber. Blended in proportions ranging from 90 of resin and 10 of neoprene to as low as 40 of resin and 60 of neoprene, a family of stocks is obtained which show a range in stiffness from that approaching polystyrene to one approaching polyethylene. In addition, they show outstanding toughness and high heat distortion and are highly resistant to impact at temperatures as low as —20° F.

Conventional curing techniques used in neoprene detract from the desirable properties of the blend, indicating that the preferred way of using these blends is uncured. Such blends may be prepared and processed on conventional rubber or plastic equipment, or they may be prepared by blending latices.

10:30 a.m.—13. **Comparison of Methods of Accelerated Aging of Latex Foam Rubber. T. H. Rogers** and H. H. Heineman, Goodyear.

Samples of foam rubber made in the laboratory and others obtained from commercial sources are evaluated using the conventional accelerated aging methods. The oxygen absorption technique and a Compression Change Oven (212° F.) Aging graph method are used for comparison.

These latter methods show some degree of correlation; whereas the conventional methods show little correlation. A similarity exists between normal room temperature aging of foam rubber, as measured by compression change, and accelerated aging, as measured by the Compression Change Oven (212° F.) Aging method.

This latter method shows the degree of after-vulcanization. Latex foam rubber containing synthetic has better long-term aging properties than that consisting of 100% natural rubber.

10:50 a.m.—14. **Load-Carrying Capacity of Latex Foam Rubber. J. A. Talalay,** Sponge Rubber Products Co., Shelton, Conn.

Specifications for foam rubber usually include a required hardness, measured by the force necessary to compress the material to 75% (in the United States) or 60% (in Great Britain) of its original height. The hardness of a slab of foam rubber depends upon the type of latex and compounding materials, upon the cell size and structure, and primarily upon the foam density.

For slab material of any given composition and structure, the hardness can be related to density by a simple equation. For cored material, hardness and density can be related by integrating deflections of small increments of height over the entire height of the article. This procedure can be reduced to a few simple equations for most shapes of core pins.

Using these equations, the effect of mold configuration on weight has been investigated, and it has been found that for any specified hardness the required weight of a foam rubber article can be reduced by: (1) increasing core pin diameter, (2) decreasing pin spacing, and (3) decreasing the thickness of the top sheet.

Use of certain synthetic rubber latices (cold GR-S), or a mixture of synthetic and natural latices, will also result in a lighter article meeting the prescribed hardness specifications.

11:10 a.m.—**Business Meeting.**

11:20 a.m.—**Charles Goodyear Lecture: The Future of Rubber. John T. Blake.**

FRIDAY MORNING—SEPTEMBER 11

A. E. LAURENCE, PRESIDING

9:00 a.m.—15. **High Polymer Training and Research at the University of Michigan. L. M. Hobbs,** University of Michigan, Ann Arbor, Mich.

At the University of Michigan high polymer courses are available to seniors and graduate students which emphasize the physical, chemical, biological, and engineering aspects of the subject. Courses in the Department of Chemical Engineering have been intensified and extended to combine the study of the fundamental features of polymerization, molecular structure, and intermolecular attractive forces with appraisal of fabrication methods and the properties of high polymers as engineering materials. Students with basic interests in various branches of chemistry, physics, or engineering can select a phase of high polymer study as an area for specialization for advanced degrees.

Funds for fellowships and equipment for fundamental research on rubber have been provided by a grant from the Goodyear company to the Michigan Memorial-Phoenix Project. Several assistantships and fellowships have been established. The emphasis of this research is being placed on the molecular and structural features which influence the internal friction of rubber, and attention is devoted to the effects of polymerization variables and fabrication methods on final properties.

9:20 a.m.—16. **Mercaptans (or Thiols) in Polymerizations: A Review with Recent Developments. A. H. Krause,** Kentucky Synthetic Rubber Corp., Louisville, Ky.

This paper includes a description of properties and general reactions of mercaptans. Mercaptans react with olefins under suitable conditions, forming normal addition products and in the presence of peroxides abnormal addition products. The value of mercaptans in polymerization reactions is as promoters, but their main function is as regulators or modifiers. They improve very much the processability and solubility of the resulting polymers. Mercaptans act through free radical mechanism as chain transfer agents. They terminate the growth of one polymer chain with their end hydrogen and start another chain with the mercaptyl radical.

Behavior of primary and tertiary mercaptans in butadiene-styrene copolymerizations at 50 and 5° C. (hot and cold rubber) is also covered. The importance of the concentration of mercaptans at the locus of reaction is discussed. Disappearance rates of mercaptans vary with type, agitation, pH, fatty acid or rosin soaps. Primary mercaptans disappear faster than tertiary mercaptans. Tertiary dodecyl mercaptan disappears at a faster rate than tertiary tetradecyl and hexadecyl mercaptan. Included also is a discussion of the determination of residual mercaptan. Other subjects covered are the stepwise addition of mercaptans to control the molecular weight for a more uniform product over a wider conversion range, side reactions of mercaptans, other polymerizations with mercaptans, and patent literature of polymerizations with mercaptans, including about 30 references.

9:45 a.m.—17. **Molecular Weights of Emulsion Polydienes. M. Morton,** Government Laboratories, University of Akron, Akron, Ohio.

In the polymerization of dienes, the cross-linking reaction can be expected to have a marked influence on the molecular weight distribution, leading finally to the formation of insoluble polymer networks. Such a reaction should have a relatively small effect on the number-average molecular weight, but a large effect on the weight-average molecular weight.

Studies of the emulsion polymerization of butadiene, isoprene, and chloroprene have confirmed the above hypothesis. The number-average molecular weights have been found to agree fairly well with those predicted from the kinetics of the system and were found to depend largely on the initiator and/or modifier used. However the viscosity-average molecular weights have been found to be dependent largely on the extent of the cross-linking reaction. Thus isoprene has been found to have a much smaller cross-linking rate during polymerization than butadiene; while chloroprene shows a higher rate.

These differences in cross-linking rate are reflected in the M_v/M_n ratio found for the above three polymers. Thus, instead of the theoretical value of 2-3 to be expected in the absence of cross-linking, the actual values rise to 5-10, depending on the monomer used and the polymerization temperature. The onset of gelation, as expected, is governed by both factors, i.e., the molecular weight and the cross-linking rate, and is therefore a function of the initiator-modifier system, the polymerization temperature, and the particular diene.

10:15 a.m.—18. **Sodium Formaldehyde Sulfoxylate as Reducing Agent in Low-Temperature GR-S Polymerization. R. W. Brown,** C. V. Bawn, E. B. Hansen, L. H. Howland, United States Rubber Co., Naugatuck, Conn.

A new recipe for polymerizing GR-S at low temperatures, composed of an organic hydroperoxide, sodium formaldehyde sulfoxylate, and an iron salt complexed with the tetrasodium salt of ethylene diamine tetra-acetic acid, has been developed. With disproportionated rosin soap as emulsifier and diisopropyl benzene hydroperoxide as oxidant, reaction times of two to 13 hours to 60% conversion at 5° C. were obtained by varying $FeSO_4 \cdot 7H_2O$ from 0.060- to 0.005-part per 100 parts of monomers. Low peroxide and sulfoxylate levels gave good rates of polymerization, indicating appreciable savings in commercial production. Activator make-up was simplified compared to that for the ferro-pyrophosphate recipes used in most of the present low-temperature GR-S production. This change results in improved uniformity in polymerization rates and in the final polymer. Pilot-plant and preliminary plant scale trials have substantiated laboratory data.

In high solids latex recipes the new activator system showed promise of giving more fluid and lighter colored latices, which should improve the appearance of products fabricated from the latex and also extend the use of low-temperature latex to some fields where it is not now usable because of discoloration. Reaction rates were adjusted to almost any desired level by varying the amount of complexed iron.

10:30 a.m.—19. **Non-Discoloring Sta-**

bilizers for GR-S. B. A. Hunter, R. R. Barnhart, R. L. Provost, United States Rubber Co.

Natural *Hevea* rubber is stabilized against oxidative deterioration by the presence of naturally occurring antioxidants. Likewise, unvulcanized synthetic rubber polymer of the butadiene-styrene class (GR-S) requires the presence of stabilizers for protection against environmental deterioration factors. GR-S is very susceptible to heat deterioration during manufacture of the polymer and particularly during hot processing when being fabricated into rubber products unless an effective stabilizer is present. The benefits of the stabilizer appear as positive protection against heat resinification during manufacture and storage and especially as protection against the deterioration of the ultimate properties of the vulcanizate which results from heat degradation of the polymer during hot milling and processing.

Several conventional rubber antioxidants are effective stabilizers but are badly discoloring. Non-discoloring stabilizers have been introduced which vary widely in their effectiveness. Data are presented comparing the effects of a number of GR-S stabilizers that have seen commercial use in the United States. Particular attention has been given to non-discoloring types. Advantages of the alkylated aryl phosphite class of stabilizers are seen in resinification data, control of gel build-up, and prevention of wide Mooney viscosity variations during heating or hot processing and are particularly evident in the retention of the physical properties in vulcanizates from polymers subjected to processing heat.

10:55 a.m.—20. **Solution Coatings of Chlorosulfonated Polyethylene. R. H. Sudekum,** du Pont, Wilmington, Del.

Chlorosulfonated polyethylene has been found to have outstanding resistance to ozone and many chemicals and to have good colorability and weather resistance. These properties combined with good adhesion to a variety of materials make it an excellent polymer for flexible, protective, and decorative coatings. Rubber articles that crack because of ozone and sunlight can be protected with coatings which are resistant to abrasion and have good elongation. The staining materials in most black rubber vulcanizates can be prevented from discoloring the coatings by the incorporation of aluminum powder and large amounts of colorants in the solution. These solution coatings can be prepared by standard techniques. Since the chlorosulfonated polyethylene has good solubility in aromatic hydrocarbons, solutions containing up to 25% solids can be used. A higher solids content can be obtained from a dispersion in a non-solvent medium.

The coatings can be applied by brushing, spraying, or spreading. They have been used to coat rubber, fabrics, metals, and masonry. Sponge rubber door and window seals and reclaim automotive floor mats have been successfully protected and decorated.

Uncured chlorosulfonated polyethylene has sufficient strength to be used for clear lacquers. Since these lacquers have very high elongations and retain their ozone resistance, they are being tested for coatings of balloons, boots, and toys.

11:20 a.m.—21. **Blends of Chlorosulfonated Polyethylene with Butadiene-Acrylonitrile Copolymers. F. F. Holub,** R. A. Hutchinson, W. J. Remington, du Pont.

Chlorosulfonated polyethylene, when properly vulcanized, possesses many outstanding properties including unusual durability on exposure to ozone, oxygen, heat, and weather. Vulcanized butadiene-acrylonitrile copolymers, on the other hand, have achieved wide recognition because of their outstanding oil resistance. It has been shown that these elastomers are mutually compatible, and by varying their concentration in blends, varying degrees of ozone and oil resistance can be obtained. In addition, by suitable blending, good low-temperature properties and heat, abrasion, and flex resistance may be obtained. Blends containing more than 25% chlorosulfonated polyethylene possess a useful degree of ozone resistance and are of particular interest. Oil resistance is largely a function of the acrylonitrile content in the total elastomer and improves with increasing nitrile concentration.

The curing system for these blends requires new compounding systems because of the differences in the chemical structure of the individual elastomers. The best vulcanizates are obtained when litharge is employed as the curing agent for the chlorosulfonated polyethylene and as the accelerator-activator for the acrylonitrile rubber. It is possible to bring out the best characteristics of both elastomers by variations in the concentration of sulfur, accelerator, and filler.

11:40 a.m.—22. **Adhesives for Chlorosulfonated Polyethylene. G. H. Bowers,** I. D. Roche, R. C. Baker, du Pont.

The combination of colorability and durability found in chlorosulfonated polyethylene is unique in the elastomeric field. To take advantage of these properties it is often necessary to bond this elastomer to itself and to other materials. This paper discusses the characteristics of some of these bonds.

Chlorosulfonated polyethylene compositions have been bonded to various metals, using both commercial and newly developed adhesives. These bonds are capable of withstanding prolonged immersion in hot water.

In some formulations, chlorosulfonated polyethylene, like other hydrocarbons containing chlorine, can liberate HCl and cause the degradation of the fabric with which it is in contact. This fabric tendering is prevented by the use of MgO in the adhesive curing system. Chlorosulfonated polyethylene can be bonded to Dacron (polyester fiber), Orlon (acrylic fiber), and nylon, using an adhesive based on the polymer itself.

An adhesive based on chlorosulfonated polyethylene will bond this elastomer to itself and to the common elastomers with good strength. Both room and elevated temperature strengths of these bonds are good. Using a room temperature cure, vulcanized chlorosulfonated polyethylene can be bonded to itself with a strength equal to the tear strength of the vulcanizate.

Rubber Compounding Lecture Series

THE second group of lectures on basic rubber compounding techniques will be held in the John Marshall Law School, Chicago, Ill. Sponsored by the Chicago Rubber Group's educational committee under the chairmanship of Bert Vandermar, the course will be similar to the successful series recently completed in which lecturers from various fields spoke. Besides the location change there will be an attempt to improve the integration of the various lectures with an overall instruction pattern. The course is expected to begin about the third week in September; the fee will be approximately $20.

Synthetic Rubber Specification Changes

THE Office of Synthetic Rubber, Reconstruction Finance Corp., has announced the following changes in the catalog, "Specifications for Government Synthetic Rubbers—Revised Edition—October 1, 1952": addition of specifications for GR-S-1703, -1704, -1705, -1706, -1707, -1708, -1709, -1710, -1711, -1712, and -1801; removal of specifications for GR-S-1008, -1017, -1101, -1102, GR-I-14, -16, and -60; and revision of the specifications for GR-S-1005 and of Section D-4 (Determination of Properties of Vulcanizate Compounding Recipes).

The compounds for which the specifications have been removed are no longer in production. The change in Section D-4 involves the addition of an oil masterbatch recipe. The above changes are a result of two separate announcements from the RFC dated 2/16/53 and 7/1/53.

Rubber Technology Courses by Fisher

THE TLARGI Rubber Technology Foundation of the University of Southern California, co-sponsored by The Los Angeles Rubber Group, Inc., and USC, presented two courses in rubber chemistry and technology during the Spring of 1953. Both these courses, a two-hour senior course and a three-hour graduate course, will again be given in the fall semester of this year by Harry L. Fisher, director of the Foundation and professor of rubber technology.

The senior course covers the chemistry and technology of natural and synthetic rubbers; the graduate course covers the same material, but in greater detail and also includes seminar work on very recently published articles. Both courses are given in the evening in order that men from industry may attend. In addition, a rubber laboratory course will be given in which approximately $40,000 worth of laboratory equipment and testing apparatus will be available; also, non-commercial research work will be carried out when desired by properly qualified students in this course.

International Diploma for Rubber Technicians

THE International Education Committee, at a recent meeting in Paris, France, decided to establish an International Diploma for Rubber Technicians; such diploma to be awarded upon satisfactory passage of a standard examination to be given in each of the participating countries on the same date each year. Preliminary negotiations had led to an agreement to establish an equal technical level of education in all collaborating countries on a standard comparable to that of the Licentiateship of the Institution of the Rubber Industry in London, England. General agreement has now been reached regarding requirements in preliminary and professional education, using the examination set by the IRI as the basis for the Diploma Award. Norway, Sweden, Denmark, Holland, France, Belgium, Western Germany, Switzerland, Italy, and Great Britain are expected to introduce the scheme into their countries before the end of 1954.

ASTM Annual Meeting in Atlantic City Well Attended; Committee D-11 and 17 Subcommittees Meet

THE fifty-sixth annual meeting of the American Society for Testing Materials was held in Atlantic City, N. J., during the week of June 28, with Chalfonte-Haddon Hall as headquarters. There were 565 technical committee meetings including those of Committee D-11 on Rubber.

Two outstanding lectures were presented during the meeting, one on "An Excursion in Petroleum Chemistry," by Frederick D. Rossini, Silliman Professor and head of the Department of Chemistry and director of the American Petroleum Institute Research Laboratory at Carnegie Institute of Technology; the other by Jerome Strauss, vice president, Vanadium Corp. of America, on "Micrometallurgy."

Leslie C. Beard, Jr., assistant director of the Socony-Vacuum laboratories, Socony-Vacuum Oil Co., Inc., was elected president of the Society for 1953-1954, and C. H. Fellows, director, engineering laboratory and research department, Detroit Edison Co., was elected vice president.

Committee D-11 Meeting

The meeting of Committee D-11 on Rubber and Rubber-Like Materials was held the morning of July 3, with Simon Collier, Johns-Manville Corp., presiding and assisted by A. W. Carpenter, The B. F. Goodrich Co., secretary.

Mr. Collier first asked that the members stand for a moment of silent prayer in tribute to the memory of L. E. Cheyney, Minnesota Mining & Mfg. Co., and C. G. Cashion, Firestone Tire & Rubber Co., both of whom had died recently. Dr. Cheyney had been chairman of subcommittee 20 on Adhesion Tests. Mr. Cashion had been chairman of a section of subcommittee 17 on Hardness, Set and Creep.

It was then announced that K. F. Cullison, Goodrich, had accepted the chairmanship of subcommittee 3 on Rubber Thread and that H. H. Irvin, Marbon Corp., had accepted the chairmanship of subcommittee 20.

R. D. Stiehler, National Bureau of Standards, and leader of the American delegation at the June meeting in Paris, France, of the International Standards Organization, was complimented on his work at this meeting in connection with ISO Technical Committee 45 on Rubber. It was pointed out, however, that ASTM Committee D-11 was the appointed representative of the American Standards Association, official American organization member of ISO. It was also necessary to provide another subcommittee in Committee D-11 as the "American group for ISO action," and the formation of such a subcommittee was approved, with Dr. Stiehler as chairman.

Committee E-11 on Quality Control of Materials has established associate memberships and has asked for one representative each from the several other ASTM technical committees to act as liaison agents on problems of the particular technical committees. It was agreed that J. D. Heide, United States Rubber Co., and chairman of D-11's subcommittee 28 on quality control, should become an associate member of Committee E-11.

Certain errors in the printing of the December, 1952, issue of the D-11 Manual were mentioned. D15-52T, Physical Testing of Rubber Products, section 5a, has standard formulae for four natural rubber compounds, and the whiting loaded compound does not show any accelerator content. One part of benzothiazyl disulfide should be used. D746-52T, Brittleness Temperature of Plastics, paragraph 5, on "Test Specimens," gives the tolerance for the width of specimens as 0.015-inch, it should be 0.15-inch.

A cell-type oven conforming to the specification E95-52T, Cell-Type Oven with Controlled Rates of Ventilation, was on display during the meeting.

A new policy tried out by Committee D-11 at the Atlantic City meeting was that of having one or more papers on matters of interest to the committee presented at the regular D-11 meeting. Accordingly, a paper entitled, "Fundamental Principles of Interlaboratory Tests," by John Mandel, NBS, was a feature of this meeting.

Mr. Mandel's talk dealt with the elementary principles underlying interlaboratory tests. The basic principles are the same as those underlying tests in a single laboratory and have their origin in the behavior of measurements. Simple illustrations were given of the behavior of experimental observations both individually and collectively. The laws of their behavior form the science of statistics which enables a large number of observations to be summarized in a few statistical measures, for example, mean and standard deviation.

For comparison of two or more methods, the concept of sensitivity was presented. This concept takes into account both the reproducibility of measurement and the difference in values obtained for different samples.

Another factor that must be considered in any test is systematic error or bias. It was shown how the design of experiment can detect systematic errors and eliminate their effect on the comparisons in which one is interested.

In designing an interlaboratory test, the purpose of the test must always be borne in mind. Those elements that can best be studied within a single laboratory should not be included. An interlaboratory test is a costly and inefficient research tool and therefore should be preceded by exploratory tests in a single laboratory to determine exact techniques and the conditions of test. After the test is developed, an efficient interlaboratory test can be designed. It should include the widest variations in materials that may be expected in order that valid comparisons of instruments, techniques, and laboratories under conditions most likely to be encountered in practice may be obtained.

In summary, it was said that the science of statistics is a tool that the scientist or technologist can use to advantage in his daily work. The objective of statistics is to give a maximum of valid information with a minimum of effort. The application of statistics to interlaboratory tests is particularly rewarding because of the costliness and complexity of such tests.

The next meeting of ASTM at which Committee D-11 will participate is to be held at the Hotel Shoreham, Washington, D. C., February 1 to 5, 1954.

D-11 Subcommittee Meetings

Subcommittee 5—Wire and Cable. John T. Blake, Simplex Wire & Cable Co., chairman. The proposed specification for polyethylene was discussed at length and was accepted, with modifications, for letter balloting in the subcommittee. It was voted to make D27-52T, Specifications for Insulated Wire and Cable: Class AO, 30% *Hevea* Rubber Compound, more concise by eliminating everything but the physical and electrical requirements. It was also voted to submit the draft of the butyl rubber specification to letter ballot. The new drafts of the proposed constructional specifications for the several natural and synthetic rubber wire and cable compounds are also to be letter balloted.

The new draft of D470-52T, Methods of Testing Rubber Insulated Wire and Cable, was discussed, and this draft will be letter balloted.

Several items were referred to the specification section for study.

Subcommittee 6—Packings. F. C. Thorn, Garlock Packing Co., chairman. The section on rubber sheet packing, headed by J. E. McGraw, General Electric Co., submitted a draft of a proposed specification for circulation within the subcommittee. It is hoped that the finished draft may be reported to Committee D-11 at the next meeting. If so, it will be the first product specification to be sponsored by subcommittee 6 in 20 years.

Mr. Kapps, who replaced R. D. Farnum, F. D. Farnum Co., as chairman of the section on relaxation testing of gaskets, read a progress report outlining the pitfalls involved in the measurement of relaxation at constant strain. This report will be distributed within the subcommittee and will outline the minimum requirements for accuracy of strain gage readings, rigidity of jig, timing of load application, shape and size of specimen, etc.

Subcommittee 7—Rubber Latices. G. H. Barnes, Goodyear Tire & Rubber Co., chairman. Dr. Stiehler reported on matters pertaining to rubber latices discussed at the Paris International Standards meeting.

In connection with mechanical stability determinations, a change in the mean diameter of the test container in D1076-52T, Specifications and Tests for Natural Rubber Latex, from 2.31 inches to 2.28 inches, is being recommended so that ASTM and ISO standards will agree.

It was reported that ISO is in agreement with the methods in D1076-52T for the sampling of bulk latex. The subcommittee is recommending that the description of the sampler used be removed from D1076-52T, but otherwise the method be left as now written. The method proposed by ISO for sampling of drums was discussed and considered inadequate. A section made up of three latex distributors was appointed to develop a more satisfactory method.

E. G. Partridge, American Anode, Inc., reported on a method for the determination of the physical properties of cured latex films. Several minor changes were suggested, and after further checking, a revised method will be presented to the subcommittee.

Specification limits for Cu, Mn, and Fe content of latices were discussed, and since this problem is related to methods of analysis, samples of latex for analysis will be submitted to subcommittee 11 on Chemical Analysis, and a section from subcommittee 7 will work with subcommittee 11 on this problem.

No satisfactory method for the determination of chemical stability has been developed to date. A new method was proposed by General Latex & Chemical Co., and a task group was formed to investigate this matter.

It was decided to continue the specification limit of 400 seconds for mechanical stability in D1076-52T. John McGavack, U. S. Rubber, suggested an improved method of determining the end point of this test which involved dipping an 80-mesh metal screen into the latex during the test.

He will distribute a write-up of the method to members of the subcommittee.

Two methods for the determination of the density of latex were submitted, and it was decided to recommend both methods for adoption, one as a preferred method, and the other as an alternate.

Subcommittee 8—Nomenclature and Definitions. Harry L. Fisher, University of Southern California, chairman. About 1,800 words have been assembled for definition and explanation, of which about 950 are now defined. It is expected that the remaining 850 will be completed and ready for publication by early fall.

Subcommittee 11—Chemical Analysis. W. P. Tyler, Goodrich, chairman. The subcommittee voted to recommend to Committee D-11 the revision of two sections of D297-50T, Chemical Analysis of Rubber Products, dealing with the analysis of rubber compound ash, in order to correct errors in the analytical method; the exact changes to be recommended are subject to letter ballot of the subcommittee.

A very complete summary of methods of analysis of organic materials for traces of copper was presented by task group leader, Norman Bekkedahl, NBS. The subcommittee made decisions regarding the particular methods which should be included in the forthcoming testing program on crude natural and synthetic rubbers and on natural rubber latex.

Methods for the determination of manganese and iron in crude rubber and latex were also presented and tentatively approved for use in the testing program.

Subcommittee 12—Crude Natural Rubber. Norman Bekkedahl, chairman. The chairman announced that the two methods for the quantitative determination of harmful dirt in crude natural rubber received no negative votes in letter balloting in subcommittee 12 and Committee D-11.

Dr. Stiehler reported on matters pertaining to crude natural rubber which were discussed at the recent ISO Paris meeting. Proposals on the sampling of crude natural rubber are to be presented at the next ISO meeting by both the United States and Great Britain. The storage of compounded rubber in a closed container prior to testing was considered satisfactory to avoid humidity effects. The United States is to submit a proposal for a Mooney cure test at the next ISO meeting. A working group consisting of France, United States, United Kingdom, and Netherlands was established to consider methods proposed by the Netherlands and the United States for the determination of dirt in crude natural rubber.

A paper on the effect of moisture on the rate of cure of natural rubber was presented by Rolla H. Taylor, formerly with the U. S. Department of Agriculture.

Subcommittee 12 is being assisted by subcommittee 28 in developing a procedure for sampling crude natural rubber, and by subcommittee 11 in developing quantitative procedures for determining Cu, Mn, and Fe in this rubber.

Subcommittee 17—Hardness, Set, and Creep. Sherman R. Doner, Raybestos-Manhattan, Inc., chairman. C. K. Chatten, N. Y. Naval Shipyard, described and exhibited a newly designed stress relaxation cell developed in his laboratory. He reported that to date the correlation of results had not been good and recommended that the subcommittee confine its work to developing a suitable test cell and procedure before conducting any more round-robin tests.

The chairman reported that only one negative vote out of 129 cast was received on the change involving the use of cool jigs in D395-52T, Compression Set of Vulcanized Rubber. It was agreed that the committee had proved the change sufficiently to override this one negative vote.

T. O. Mathues, Inland Mfg. Division, General Motors Corp., tentatively agreed to assume the chairmanship of the section on hardness testing instruments, left vacant by the sudden death of C. G. Cashion.

Dr. Stiehler reported on matters of interest to subcommittee 17 which had been discussed at the meeting of the ISO in Paris, as follows:

1. Since the methods used in different countries for the determination of compression set differ so widely, a working group consisting of France, Germany, Italy, Netherlands, United States, and the United Kingdom was established to study the effect of ratio of diameter to thickness of the specimen and the effect of confining or allowing free movement between specimens and compression plates.

2. A copy of ISO/TC 45, "Second Draft Proposal for the Determination of Hardness," was distributed. This draft has been approved by Technical Committee 45 of ISO and is awaiting final approval of the main ISO committee. Only a majority vote is required to make this a tentative ISO standard and such action seems assured.

The subcommittee chairman pointed out the desirability of eventually adopting the ISO hardness standard as the ASTM standard, since the former is technically sound and would not materially affect our present conception of hardness values.

F. N. B. Bennett, W. H. Wallace Co., Ltd., London, England, demonstrated and described both the bench-type and the portable-type hardness testing instruments manufactured by his company. These instruments read in ISO hardness units.

Subcommittee 18—Flexing Tests. B. S. Garvey, Jr., Sharples Chemicals, Inc., chairman. Dr. Stiehler reported on matters of interest to subcommittee 18 resulting from the June ISO meeting in Paris. ISO/TC 45 has run two sets of comparative tests on crack growth measurement. This work has been handled for the United States by the chairman of subcommittee 18 and is covered by a report submitted to the subcommittee. No change was suggested in this method of operation except for the possibility that two or three sets might be run in the United States.

It was agreed in Paris to reduce the free length of the specimen to three inches and to report the kilocycles for crack growth in three steps: (a) from two to four minutes, (b) from four to eight minutes, and (c) from eight to 12 minutes. A new draft of the proposed method is to be prepared for circulation and trial before the next ISO meeting, in the Fall of 1954.

In 1952 a section headed by K. L. Keene, U. S. Rubber, and including B. N. Larsen and D. E. Baker, was appointed to investigate the possibility of running de Mattia flex tests, D430-51T, either outdoors or in an ozone cabinet. The section was not ready to report, but the extent of the discussion indicated a continued interest in the subject.

The discussion of the ISO work done in connection with D813-52T, Resistance of Vulcanized Rubber or Synthetic Elastomers to Crack Growth, indicates increasing interest in this method. Several phases were considered.

It was decided to make no change in the free length of the specimen until a more complete report of the ISO work is available. The need of editorial revision to make definite the free length of the specimen was apparent, and Ross Shearer, Goodrich, will check with various laboratories and report their current practice before the next meeting.

Variation in the length of the stroke is one method of varying the severity of the test, but no change is recommended at present. B. G. Labbe, Akron Government Laboratory, agreed to distribute copies of his report of January 16, 1952, on this subject to the subcommittee.

The present piercing tool is considered satisfactory, and a source of supply of this tool is being investigated. The possibility of using a die set as a punching jig was suggested and will be investigated more fully.

The possibility of using one or more of the ASTM standard compounds for control specimens was favorably received, but was considered somewhat premature.

Rather than establish a new section to conduct new tests in connection with D813-52T at this time, it was agreed that G. C. Maassen, R. T. Vanderbilt Co., should report on work he is doing and try to get reports from several other laboratories, in order to obtain a basis for additional studies.

There was considerable discussion of the need or the desirability of D813-52T. The tire industry does not consider it a direct measure of tire quality, although it is used in evaluation work with varying emphasis depending on the company, time available, etc. The following conclusions were reached: (a) the test is not a precise one and does not correlate closely with service, (b) crack growth is a significant factor in the service of tires and other items, (c) this is the only test used at all widely, and (d) the method is important and should be kept and improved.

Subcommittee 20—Adhesion Tests. H. H. Irvin, chairman. In view of the recent sudden death of L. E. Cheyney, former chairman of this subcommittee, the new chairman devoted much time to planning future work of the subcommittee. The proposed revisions and purpose of the present program in connection with D429-47T, Adhesion of Vulcanized Rubber to Metal, were reviewed. It was decided that samples of the now-standard A & B tests, as well as samples of the proposed revised tests, should be made up, and the relative merits of each determined. A description of the planned testing program involved is to be submitted, however, to subcommittee 28 on Statistical Methods in advance of any actual work. Both the planning of the testing program and the analysis of the final results will be worked out in conjunction with subcommittee 28.

Dr. Stiehler reported on that part of the ISO meeting of interest to subcommittee 20 and suggested that his report on these matters be reviewed.

Subcommittee 21—Rubber Cements and Related Products. J. F. Anderson, Goodrich, chairman. Changes in D1205-52T, Tests for Brake Lining Adhesives and Other Friction Materials, recommended at the March meeting were presented to Committee D-11 for approval.

G. W. Koehn, Armstrong Cork Co., reported for the section responsible for the revision of section 16 of D1205-52T, on flow testing of aged bonding tape and cement film. Some data have been obtained using the Mooney viscometer over a temperature range of 250 to 400° F., and work is also in progress on a "dead load" test.

A. J. Kearfott, GM Corp., reported that he has obtained an impact machine suitable for testing metal to metal bonds and that he should have some data to report by the next meeting.

R. G. Westerman, Ford Motor Co., suggested a bend test be added to D1205-52T, for use with very thin friction material sections where shear testing cannot be performed. A section headed by Mr. Wester-

man and including Mr. Kearfott and J. Rohner, Raybestos-Manhattan, was appointed to investigate and develop methods for a bend test.

Subcommittee 22—Cellular Rubbers. H. G. Bimmerman, E. I. du Pont de Nemours & Co., Inc., chairman. In order to complete the tables in D1055-52T, Latex Foam Rubbers, the following additional new grades of The Rubber Manufacturers Association: R-20½, cored, and R-36, R-37, and R-38, all uncored, will be added after approval of the subcommittee is obtained.

The static fatigue test now shown in the RMA "Buyers' Specification—Latex Foam" (As revised April 1, 1953) will be submitted to the subcommittee for approval.

E. C. Svendsen, U. S. Rubber, will try to develop a method for using a dial gage for measuring the thickness of soft sponge and report to the subcommittee by September 15.

The need of a satisfactory test for the flame resistance of foam sponge has been brought up in section 4N of SAE-ASTM Technical Committee on Automotive Rubber. C. S. Yoran, Brown Rubber Co., and Mr. Svendsen will follow this work and recommend action by subcommittee 22 when a suitable method is available.

Mr. Svendsen will also investigate the need of a method of determining tensile strength of foam sponge and a method for determining the staining of upholstery material by foam sponge and report his findings to the subcommittee.

Specification limits for silicone and polyacrylate sponge submitted by Sponge Rubber Products Co. will be considered by the subcommittee.

Dr. Yoran will determine the need and limits of additional requirements for expanded rubbers. Items to be considered are compression set, oven and oil aging, and low-temperature characteristics.

It was decided that the final reading after application of load in the low-temperature test in D1056-52T, Sponge and Expanded Cellular Rubber Products, should be taken after 30 seconds instead of instantaneously.

Subcommittee 23—Hard Rubber. G. A. Kanavel, Vulcanized Rubber & Plastics Co., acting chairman. The asphalt section discussed testing machines for the drop impact test in D639-52T, Asphalt Battery Containers. Data from the two existing machines were reviewed, and blueprints of a proposed third machine examined. An effort will be made to select one machine satisfactory to all members of the subcommittee.

In connection with the section in D639-52T on "Sensitivity to Hot-Cold Cycle," paragraph 26d is to be written so as to require an electrical test method to determine failure.

It was agreed that acid absorption in D639-52T should be expressed as milligrams per square inch of exposed surface, instead of the specimen weight increase as now required. An adequate method of sealing the cut edges of the specimen will have to be developed, however, before this change in the method can be made.

The hard rubber section of the subcommittee heard a report from C. P. Morgan, Vulcanized Rubber, on the use of the Rockwell superficial tester for determining hardness of thin sectioned hard rubber. Although the results were largely negative, more studies are contemplated.

H. Strauss, Exide Battery Co., will prepare a tentative procedure for the use of the impact test for asphalt battery containers now in D639-52T, for possible use as an impact test for hard rubber in D530-50T, Hard Rubber Products, and circulate the write-up in the subcommittee.

A study of D648-45T, Heat Distortion Temperature of Plastics, a D-20 method, as a replacement for the softening point test for hard rubber in D530-50T, is to be made by members of subcommittee 23, in order that this matter may be discussed at the next meeting.

Subcommittee 24—Coated Fabrics. R. H. Tinsey, Vanderbilt, chairman. K. L. Keene, section chairman on abrasion testing, reported that a great deal of work has been done with the Stoll wear tester since the last meeting, but unfortunately most of this work has been done on textiles rather than on coated fabrics. The indications are, however, that the Stoll machine will give reproducible results and should be well adapted to the evaluation of both flex and flat abrasion of coated fabrics. A list of the companies using the Stoll machine will be used to get a report on their work, and also an attempt will be made to run a round-robin test on several grades of coated fabrics. A report will also be obtained from Charles Simon, of Committee D-13 on Textiles on the use of the Stoll machine by that committee.

E. B. Roberts, Hood Rubber Co., section chairman on adhesion testing, reported that the part of D751-52T, Rubber Coated Fabrics, dealing with "Adhesion of Coating to Fabric," should be rewritten, particularly with respect to the adhesion testing of thin films. The new version will be circulated in the subcommittee. In this connection, the subject of jaw-speed separation, now set for two inches per minute, will be re-examined, since CCC-T-191b calls for 12 inches a minute.

The Galbo tester has been found to be of considerable interest as a means of testing the flex resistance of coated fabrics. J. H. Bowen, Jr., Bureau of Aeronautics, U. S. Navy, has agreed to cooperate with subcommittee 24 in testing several grades of coated fabrics for flex resistance.

Subcommittee 25—Low-Temperature Tests. R. S. Havenhill, St. Joseph Lead Co., chairman. O. H. Smith, section chairman on the temperature-retraction test procedure, circulated the final draft on this method, which included the use of 50% elongation and the use of gaseous heat transfer media, and it was recommended that the method be adopted as a tentative ASTM standard, subject to letter ballot in Committee D-11.

A. C. Hanson, Rock Island Arsenal, reporting for R. F. Shaw, also of the Arsenal and section chairman on D1053-52T, Low-Temperature Stiffening with the Gehman Apparatus, circulated copies of additions to the present method which would permit testing in liquid media or a cold box. These additions will be made to D1053-52T, subject to letter ballot in Committee D-11.

Mr. Labbe described with color slides the Gehman apparatus used at the Government Evaluation Laboratory in Akron, in which liquid nitrogen is used as the heat transfer medium.

James J. Sinclair, Philadelphia Quartermaster Depot, described the new multiple-holder, movable head Gehman apparatus, which was developed at the Depot. He explained that comparable results were obtained with either gaseous or liquid media.

W. N. Keen, du Pont, chairman of the section on D746-52T, Brittleness Temperature of Plastics and Elastomers on Impact, reported that agreement had been reached between Committee D-20 on Plastics and SAE-ASTM Technical Committee A on a "go-no-go" provision which would replace paragraph 7g of this method. This specification is the same as found in D746-44T, which states that a minimum of five specimens shall be tested, and none should fail. A footnote is also to be added to D746-52T, referring to paragraph 7g and mentioning temperatures of —40 or —65° F. which are normally used in acceptance work for rubber-like materials.

Roger Boyd, Bakelite Corp., and liaison between Committee D-20 on Plastics and Committee D-11 on Rubber, also reviewed this controversy between D746 and D750 and confirmed the acceptance by D-20 of Mr. Keen's proposal.

The above-mentioned changes in D746-52T will be submitted by D-11 to D-20, subject to letter ballot in D-11, with several refinements in scope included.

Dr. Hanson, section chairman on the solenoid *versus* the motor driven brittleness tester, reported that the results of a round-robin test showed little difference between these two types. He recommended that no changes be made in D746-52T at this time. Unexpected variability in data obtained on the motor driven equipment, as reported by Mr. Hanson, will be investigated further by Bruce Lewis, Tinius Olsen Testing Machine Co.

Both F. L. Graves, American Cyanamid Co., and Dr. Hanson pointed out that overloading the solenoid machine could lead to erroneous results. This overloading was brought about by an error in D746-52T as printed in the December, 1952, D-11 ASTM manual with regard to specimen widths and type required with the Scott Testers device. The correct text for the method which specifies 10 T-50 specimens appears in the D-20 manual and Part 6 of the bound volume of the 1952 ASTM Standards. Dr. Hanson also reported that the effect of alternating current on the speed of the solenoid action was insignificant.

Subcommittee 26 — Processibility Tests. Rolla H. Taylor, Scott Testers, Inc., chairman. The subcommittee chairman reviewed ISO TC 45 document 178 on Mooney viscosity and included his comments concerning the inadequacy of the method proposed in this document.

Dr. Stiehler reported that in view of the above comments and other action taken by the American delegation at the June ISO meeting in Paris, the ISO agreed to postpone action on the proposed method for the Mooney viscometer until such time as the various delegations could bring their ideas into more general agreement.

Dr. Stiehler also urged that subcommittee 26 prepare a document on the Mooney viscometer for presentation at the next ISO meeting. He urged further that this document contain opinions regarding the suitability of the radially grooved rotors and one-piece dies recommended by the National Bureau of Standards. The chairman of subcommittee 26 was authorized to prepare such a document.

Subcommittee 27—Resilience. E. G. Kimmich, Goodyear, chairman. The subcommittee is to survey the degree to which the various forced vibration tests are being used and the amount of confidence placed in the results of such tests.

The section on the Yerzley oscillograph test has been studying two proposals for changes in D945-52T, Mechanical Properties by the Yerzley Oscillograph, that is, (1) allowance for creep during test, and (2) reducing the thickness of the shear specimen to increase the stress during test. The section requests the opinion of members of Committee D-11 and others as to the desirability of the creep allowance in view of the increased work in calculating the results, and the general desirability of increasing shear stress to 90 psi.

Four errors have been found in Figures 5 and 6 in the latest printing of D945-52T, and editorial corrections were requested.

The section investigating the use of the rebound pendulum for resilience, D1054-49T, for very hard rubbers (90 durometer and above) reported that reduction of vi-

STATEX·125

the standard SAF

★ IN PASSENGER TIRES — Mileage gains averaging 25% over HAF!

★ IN TRUCK TIRES — Substantially decreased flex cracking plus improved mileage!

★ IN CARCASS PLIES — Recent production developments indicate successful application in carcass plies for truck tires!

STATEX-125 is today's best answer to the challenge of high speed and high power. Since production began 16 months ago, tire manufacturers have established this fact to their complete satisfaction.

• A COLUMBIAN COLLOID

COLUMBIAN CARBON CO. · BINNEY & SMITH CO.

MANUFACTURER DISTRIBUTOR

SAF (Super Abrasion Furnace)

STATEX-125

◆

HAF (High Abrasion Furnace)

STATEX-R

◆

MPC (Medium Processing Channel)

STANDARD MICRONEX

◆

EPC (Easy Processing Channel)

MICRONEX W-6

◆

FF (Fine Furnace)

STATEX-B

◆

FEF (Fast Extruding Furnace)

STATEX-M

◆

HMF (High Modulus Furnace)

STATEX-93

◆

SRF (Semi-Reinforcing Furnace)

FURNEX

COLUMBIAN CARBON CO. • **BINNEY & SMITH CO.**

MANUFACTURER DISTRIBUTOR

bration by reducing the angle from which the pendulum is released does not increase the accuracy of testing rubbers in this hardness range. Consideration is being given to limiting the rubber hardness for which satisfactory determinations should be expected.

Subcommittee 28—Statistical Quality Control. John D. Heide, chairman. Dr. Stiehler reported that the ISO would give consideration to statistical errors of testing at its meeting in 1955 or 1956.

Dr. Stiehler reported also on the partial analysis of the data of subcommittee 15 on the aging of rubber. The data on the interlaboratory aspects of the test produced negligible results. The analysis of the data on the change of tensile and modulus of GR-S stocks with aging produced no conclusions. The analysis of the data on the change of the ultimate elongation of GR-S on aging indicated that the decrease in elongation is proportional to the square root of time. A method for predicting the effect of natural aging on elongation by means of accelerated tests was proposed. The data and the report will be returned to subcommittee 15 for use in the analysis of the data on other types of rubber.

Mr. Irvin, chairman of subcommittee 20 on adhesion tests, requested assistance in setting up a round-robin test program for the evaluation of proposed changes in methods of determining rubber to metal adhesion. The problem was assigned to a task group.

A task group, composed of Stiehler, Carpenter, Proctor, Peakes, and Monks, will investigate the write-up of Committee E-11 on interlaboratory testing to determine its value to the work of Committee D-11.

A task group, composed of Cameron, Bekkedahl, Dahlstrom, and Wood, will work with subcommittee 12 on the problem of the proper method of sampling crude natural rubber. Necessary data will be supplied on request by subcommittee 12.

Meeting of Committee E-1, Task Group B

A meeting of Task Group B of Committee E-1 was held July 1. Mr. Havenhill is also chairman of this task group.

F. M. Gavan, Armstrong Cork, chairman of the section on stiffness and brittleness, reported on the discussion among Committee D-11, Committee D-20, and SAE-ASTM Technical Committee A, and Task Group B, which took place at the suggestion of P. J. Smith, of the ASTM headquarters staff, on the matter of the request for a "go-no-go" section in D746-52T. Mr. Boyd, of D-20, pointed out the value of the statistical brittleness temperature used in D746-52T. The proposal of Mr. Keen (see report of subcommittee 25, above) for a "go-no-go" provision in D746-52T is recommended to D-20 by E-1.

Mr. Chatten and L. E. Carlson, General Tire & Rubber Co., discussed the Navy's request that the definition of M be changed to take into account the mass of the arm and bending plate Q in D747-50. It was agreed that the request should be referred to Committee D-20, which has jurisdiction over this method.

Mr. Shearer circulated his report on the round-robin on hardness testing which involved seven different hardness instruments, four stocks, and temperatures from 78 to —80° F. Fair correlation of the instruments was shown; however, it was pointed out in the report that the effects of creep would not be the same, and good correlation could not be expected.

T. A. Werkenthin, Navy Bureau of Ships, presented statistical data on Bureau of Ships low-temperature hardness tests for a variety of stocks which indicated good correlation of the various hardness testers, such as Shore, Olsen, Rex, etc. Subsequent discussion revealed that additional calculations are required to develop conversion formulae for use with the results obtained by the different machines. If satisfactory conversion formulae can be developed, they may be of great value.

Mr. Gavan reported that A. C. Webber would prepare an analysis of the different instruments used for the brittleness test, preparatory to the round-robin test which will be made later if considered advisable.

Mr. Gavan also reported that F. S. Conant, Firestone, had prepared and circulated copies of a report on the stiffness round-robin. When all comments have been received, the final draft will be submitted for publication.

SAE-ASTM Technical Committee on Automotive Rubber

A brief report on the activities of SAE-ASTM Technical Committee on Automotive Rubber was made by J. J. Allen, Firestone, secretary of that committee. Technical Committee A has had one meeting since March, on June 17 in Detroit, Mich.

Three letter ballots have been taken as follows: (1) The SAE Recommended Practice for Bench Leakage Test for Oil Seals for Rotating Shafts received 14 affirmative votes, no negative votes, and 15 not voting. The specification is to be published by SAE only. (2) The various revisions of ASTM D1170-51T, Non-Metallic Gaskets, received 14 to 16 affirmative votes, no negative votes, and 15 to 17 not voting. It was recommended that the revisions be submitted to letter ballot in Committee D-11. (3) A letter ballot on the desirability of preparing a manual of laboratory test procedures received 11 affirmative votes, 13 negative votes, and six not voting. No further work is therefore contemplated on this project.

Section 1 is still working on its round-robin test to determine the reproducibility of the Yerzley oscillograph method for resilience, D1207-52T, and is developing a proposed method for a practical test on engine mounts.

Section 2 on automotive bumpers will probably be reactivated when subsection 4T completes its work on a repeated impact test for determining fatigue life.

Section 3 is considering some revisions in the automotive hose specifications.

Section 4 reports that the field exposure tests on the weather aging of rubber products are now well into the second year. The accumulated data are now being analyzed. Subsection 4D is not planning any major changes in the compound tables in D735-52T, Rubber and Synthetic Rubber Compounds for Automotive and Aeronautical Use, other than some progressive revisions in the TA tables on silicone rubbers. It is planned to change the water absorption test from 168 hours at 158° F. to 70 hours at 212° F.

Section 6 is planning to review its automotive V-belt specifications.

Section 13 on finishing standards for molded and extruded items has worked out a proposed method for indicating the degree of trim or rind or mold overflow on various types of product and will provide a method of indicating this information on product blueprints.

Panel Discussion on Machinery Maintenance

A PANEL discussion on "Maintenance of Rubber Machinery" highlighted the afternoon technical session of the May 12 meeting of The Los Angeles Rubber Group, Inc., held at the Statler Hotel, Los Angeles, Calif. J. Arensmeyer, Golden West Products, Inc., acted as moderator of the discussion, and the panel members were T. Cook, The B. F. Goodrich Co.; E. Davenport, Firestone Tire & Rubber Co.; R. Holman, W. J. Voit Rubber Corp.; L. Kotich, Ohio Rubber Co.; V. Neschke, Kirkhill Rubber Co.; and M. Uhrich, Goodyear Tire & Rubber Co.

The evening dinner session was sponsored by United Rubber Corp., which donated 10 door prizes. After-dinner speaker was Hampton Pool, head coach of the Los Angeles "Rams" professional football team, who also showed movies of its games.

Panel Questions and Answers

1. Q. On large bull gears is it better to use a drip pan and light grease, or a tacky grease?

A. Davenport. Under abnormal conditions, such as dirty or dusty conditions, excessive loads, or excessive speeds, I would prefer the drip pan and a light grease. We have been using this method on our Banburys for several years with good results. A good tacky asphalt-base grease, properly used at the right time, will give good service. We have been using this type of grease for the last 25 years and haven't lost a gear yet. Obviously there is no set rule; a lot depends on the conditions under which the gears are operating.

2. Q. What types of ram packings are recommended for least maintenance of hydraulic presses?

A. Holman. The standard U-packing made of molded neoprene, possibly reinforced at the heel with fabric, is probably the simplest, least expensive, and most effective in the majority of cases. The condition of the ram and back-up ring is often more important than that of the packing because they retain the packing. Many other packings can be used on the rings, including a special impregnated all-fabric U-packing, but the neoprene type is sufficient in most instances.

3. Q. What is the best method to check leakage in steam traps?

A. Kotich. For a positive method I would recommend a "T" or "Y" on the downstream side of the trap, with a test valve installed in the "T" or "Y." A valve should also be installed in the return header so that you can shut it off from the main header, open the test valve, and get a positive collection from the trap. Theoretically, you should be able to tell if there is any leakage just from the temperature of the return line on the downstream side of the trap, but I am not satisfied with this method and do not think it will work in the average shop. For good trapping, of course, you should install a strainer ahead of the trap. This is where most traps are faulty since people install them without strainers, and they soon show corrosion and leakage.

4. Q. Do you have a routine set-up to check traps periodically?

A. Kotich. Yes; we make periodic collections and find much dirt and corrosion that must be cleaned out despite the presence of strainers.

5. Q. Is it satisfactory to return condensate to the boiler from vulcanizers where the steam has been in contact with the curing rubber?

A. Holman. I know of almost no instance where this practice is successful. The condensate is usually contaminated, and it it is not worthwhile to risk contaminating the boiler feed water.

A. Neschke. I have had first-hand experience with this problem. We were having boiler trouble and finally traced the difficulty to contamination of the steam condensate being returned from the vulcanizers.

6. Q. For lubricating mills and calenders, gear boxes, etc., are greases and oils containing molybdenum disulfide recommended over lubricants without this additive?

A. Uhrich. Not being familiar with this additive, I called our lubricant vendors for information. They said it is advantageous in lubricants used at high temperatures or for slow-moving loads. None of the vendors was enthusiastic about using molybdenum disulfide as an additive to the general line of lubricants.

7. Q. What changes are necessary, and what special maintenance problems are involved on an extruder to make it suitable for running vinyl or rubber interchangeably?

A. Neschke. It would be possible to use the same machine for extruding vinyls and rubber, but it is not very practical. Vinyls are commonly used in granular form, fed directly over the top of the screw, and extruded out in that manner. The plastic is taken in cold and has to be heated to temperatures as high as 400° F. Rubber extrusion involves a problem of cooling rather than heating; the machines have relatively short barrels; and the heat available, if applied to the barrel, is only about 300° F. It is possible to warm up the vinyl on a mill and feed it into the extruder at this warmer temperature. We feel, however, that extruders should be specifically for vinyls or rubbers, not for both.

8. Q. Would you say that it would be more practical to convert a plastics extruder for use on rubber by merely adding further cooling?

A. Neschke. I guess you could, but some plastics extruders are not adaptable to cooling; so this is a questionable procedure.

9. Q. What relationship should maintenance cost have to total sales?

A. Uhrich. The relationship should be zero for the sake of sales and profits. Actually, in our company, we do not tie maintenance cost in with sales. We use a conversion cost which covers manufacturing operations and not materials costs. Of that conversion cost, our manufacturing equipment runs about 6.5%, and buildings and general maintenance about 2.5%, for a total of about 9%. Adding the costs of ingredients, sales, and advertising reduces the maintenance factor to a very small percentage.

A. Cook. We do not use the sales dollar either. I wonder if most companies still don't use the pound cost.

A. Davenport. We use the pound cost system exclusively.

10. Q. What would the cost per pound be, for example?

A. Cook. The cost would vary between rubber companies. For instance, a plant making small industrial parts with a lot of finishing operations would have a higher pound cost than a tire plant.

A. Davenport. The pound cost is always much too high.

11. Q. What is the best recommended practice to maintain Banbury dust rings to prevent dust leakage? Should light or heavy oil be used, and how often should the rings be inspected?

A. Cook. The following four factors are important: (1) proper spring tension on the dust stops; (2) proper alinement of the stops so that they can move freely back and forth, yet be in contact with the end of the rotor; (3) proper lubrication; and (4) proper operation of the falling weight. Lubrication is probably the most important factor. We use Texaco Maropa No. 3 oil, which has about the same viscosity as SAE 40 motor oil. We have a reflector light on the side of the Banbury at each dust stop to help the oilers who inspect the stops daily. As for the falling weight, Farrel-Birmingham recommends that it either be allowed to fall down of its own weight, or be brought down slowly and left down for a minute or so before the full pressure is applied.

A. Neschke. Maintenance is the complete answer to the dust stop problem. We take a hydraulic ram and grease gun, put oil in it, and force the oil into the stop at higher than normal lubricator pressure. We use continual inspection of the stops and have an exhaust fan system to pull any leaking dust away before it can accumulate.

12. Q. Are you able to force this plug out of the grease hole without releasing the tension on your springs?

A. Neschke. No; normally you should take off the spring. Every third week or so we like to pull out the rings, clean them, and check the passages.

A. Davenport. We use a small pneumatic motor with a short drill and, in most of the plants, are able to drill out the plug without shutting down the line.

A. Uhrich. We have the insert to which the copper tubing is fastened, and, when we get a plug, we just screw the insert out of the ring and put another clean one in. As for drilling, we use a hardened face ring whose hole does not always match the diameter of the hole in the metal back of the ring. Drilling gave us a riveting effect, and we found it easier to use the insert-replacement system. We recently had a proposal to put the outlet hole through the hardened ring face at an angle so that it leads with the rotation of the ring. This proposal sounds good, but we haven't had enough experience to date.

As for cleaning the rings, our main problem is with the tailings that come out rather than the dust. We have a man working with a hook to keep the rings clean, but he usually breaks the oil lines with the hook.

13. Q. About how much tailings or pigments per Banbury per day do you get?

A. Uhrich. We get anywhere from 80 pounds per 24-hour day on some of our #11 mixers with care, up to as much as 180-200 pounds on other mixers. This is practically all door tailing; the amount coming out of the ring is negligible. This problem with door tailing is the result of our fellows insisting on having full pressure on the ram until the door is completely open and for perhaps a second or two after that. Some of our plants, however, have reported a total of two pounds of tailing in 24 hours.

14. Q. What pressure do you use on your floating weight?

A. Uhrich. We use 65 pounds' pressure on the 11-inch cylinder.

A. Davenport. We have an eight-inch cylinder and use 125 pounds' pressure, which is about equivalent to Mr. Uhrich's.

15. Q. For maintenance work which tools should be furnished by the company and which by the employes?

A. Davenport. It has been standard practice with us at Firestone that mechanics furnish their small hand-tools and the company supply the larger tools. Our mechanics use a tool buggy, as we term it, in which they carry enough tools to do about 90% of their jobs without going to and from the store room. Maintenance mechanics supply their own hammers, chisels, open-end wrenches, and socket wrenches up to one inch in size. Pipe fitters supply their own pliers, chisels, small wrenches, and similar tools.

A. Uhrich. Each year when we renew our contract with the union, there is pressure to reduce the number of items the employe must furnish. We require about $350-400 worth of tools from people in the machine shop, but are more lax with maintenance mechanics who can get what they need from the tool room. Of course, we furnish all drill motors and other large tools.

16. Q. Is there a standard rule of thumb for when the clearance of a tuber is excessive, and, if so, what is it?

A. Uhrich. We don't have a rule of thumb, but if we get somewhere around 0.007- or 0.008-inch clearance per inch of diameter on a six-inch tuber, we do not necessarily restore the original clearance. If there was any stock problem where we were getting curved lumps, the clearance would be checked as the primary cause. However we have many tubers running with clearances up to 0.080-0.090-inch without trouble, but this depends on the stock being run. When we restore clearances, we bring them down to 0.001-inch per inch of diameter, but do not go below 0.006-inch on the total diameter. On some occasions we have had tubers running satisfactorily with clearances of up to 0.125-inch on special stocks.

17. Q. How much clearance per inch of diameter should be allowed when rebuilding the tuber screw and inserting a liner?

A. Cook. When restoring common sizes of tubers, we figure on 0.008-inch for a 2½-inch tuber; 0.012-0.015-inch on a six-inch tuber; and 0.017-0.020-inch on 10-inch and other large machines. We think the maximum clearance depends on the screw diameter, and it should be about 0.030-inch on a 2½-inch screw; about 0.055-inch on a six-inch screw; and about 0.060-0.065-inch on a 10-inch screw. In practice we run machines with much greater clearances. As for inserting a liner, the manufacturer recommends about 0.001-0.002-inch clearance, preferably the smaller.

18. Q. What are the maximum peripheral clearances for 3A, 9, and 11 Banbury rotors before overhauling is necessary?

A. Davenport. We have only #11 Banburys, but would judge the clearances on #3 and #9 machines to be comparable to the #11. We start out with a clearance of 3/16-inch and are supposed to take out the rotor when the clearance gets up to 7/16-inch, but the need of overhauling depends largely on the type of stocks used, the batch sizes, the accelerators, and, to some extent, on how badly the Banbury production is needed.

A. Cook. We go to a clearance of three inches on a #27 Banbury.

A. Kotich. Our #11 Banbury has a clearance of close to one inch, and we are preparing to replace the rotor.

19. Q. On journal lubrication of mills, which is more adequate, grease or oils?

A. Neschke. That depends on the type of mill. Probably the ideal system is to flood lubricate the journals with oil so that you get a cooling effect as well as

lubrication. On some of the older types of mills with large clearances, oil is not too practical. Frankly, I would prefer to use grease because it can be controlled better than oil to prevent contamination of the stacks.

20. Q. Do silicone greases have a place in the lubrication of hot bearings on mills and Banburys?

A. Cook. No; silicone greases are not recommended for use on plain bearings or at high pressures, in addition to being expensive. Incidentally, we use the old remedy of sulfur and castor oil on our hot bearings.

A. Neschke. There are several other additives now on the market that we have used successfully for cooling down hot bearings, but we do not use them in general practice. We have used additives to keep bearings running beyond their normal lives.

A. Cook. The nice thing about these materials is that they are handy in a rubber plant and can be mixed in the cement room. These materials will also flush out the bearing and stop the temperature rise.

21. Q. What type of water treatment is recommended as requiring the least maintenance cost for cooling the tower water used to cool mills and Banburys?

A. Cook. We use a recirculated, refrigerated water system for our mills and calenders rather than a cooling tower system. Water enters the refrigeration unit at about 52-54° F. and leaves about 10° cooler. Because of these low temperatures we have little trouble with calcium or magnesium in the water, but do have trouble with the iron which forms a type of mud. We use a chromate treatment to control the iron. As for quantities, we use approximately one pound of chromate at 25¢ per pound per 1,100 gallons of water. Incidentally, the chromate is placed in a basket and added directly to our flume.

22. Q. What is the best type of oil seal to use on mill line bearings?

A. Kotich. For flood lubrication you are practically limited to the modified U-seal type of closure. This type of seal, made by Garlock Packing Co. and Johns-Manville Corp., usually has a very heavy heel and a slight lift held in place by some sort of spring. Garlock has a fine gear-type spring molded right into the ring, and the ring is split so that it can be put on without tearing the mill apart. Johns-Manville has pretty much the same type of seal, but uses a long spring hooked together after the seal is in place. While no closure is absolutely tight, we have had good results with these seals. Packings are not suitable because of the nature of the plugs.

23. Q. Is refrigerated cooling justifiable from a maintenance cost standpoint for mills, tubers, and stock cooling operations?

A. Kotich. No; cold water will not save maintenance costs except possibly on journal bearings. A refrigerated cooler adds to your maintenance costs because of its original equipment cost and maintenance.

24. Q. Is there any automatic type of set-up to indicate when a Banbury or mill bearing is running hot?

A. Davenport. There are numerous such set-ups on the market, but we do not have any at Firestone. We have a thermostatic unit on our large compressor that rings a bell in the dispatcher's office. This unit has proved very successful and could be installed on Banburys. The danger with any automatic unit is the possible omission of physical and manual checks and overdependence on the automatic system.

A. Uhrich. We have no automatic systems and believe that personal attention is more important than any alarm device.

25. Q. What is the best way to keep the insides of mill rolls clean?

A. Holman. I believe that an acid treatment each year or every two years, depending on service, followed by flushing, neutralizing, and reflushing is probably the simplest and most effective system. A good system of water treatment will preclude scale formation.

26. Q. What is the best way to keep Banbury spray nozzles from plugging up?

A. Kotich. As far as I am concerned, the best way is to keep the water clean. Make sure the curtains on the Banbury spray sides are clean; keep the dust out; and don't build up a sludge. Treat the water, if necessary, but basically it is a matter of keeping the cooling tower free of oil and foreign matter; keeping the pipes clean; and making sure that no dust is getting back into the system.

27. Q. Listening to the discussion, it seems that maintenance is a hit-or-miss affair. Do you leave a machine alone until it actually stops running, and then worry about it?

A. Neschke. There are two phases to maintenance. The first is preventive maintenance, which is not always possible, and the second is breakdown maintenance. The discussion has been essentially of the latter form. Preventive maintenance in many plants is a separate function performed by different people than the breakdown crew. The big problem is how to maintain something operating at high speed; you cannot grease a truck while it is running.

28. Q. Which of the four Banbury bearings gives the greatest number of failures?

A. Davenport. We have lost more bearings on the long rotor on the bull gear unit than with all the other bearings combined.

A. Uhrich. Most of our failures have been with the short rotor bearing on the drive end.

A. Cook. I would agree with Mr. Davenport.

29. Q. Do you find a difference in the amount of maintenance for a tuber using herringbone gears as compared with one using plain or cone worm gears?

A. Davenport. I think it has been proved over a period of years that there is less maintenance on herringbone gears in tubers, particularly when used under heavy loads, for continuous duty, or at high speeds.

30. Q. Does the bucket type of steam trap give less trouble than the trickle trap?

A. Cook. It is assumed that by trickle trap is meant an impulse or thermostatic type of trap. These traps operate more smoothly than the bucket trap, do not require a change in seating when the steam pressure is changed, cost much less, and, in our experience, are easier to maintain. For these reasons we would say that the trickle trap is to be preferred for most general purposes, such as dryers, unit heaters, kettles, hot water heaters, liner ironers, preheaters, radiators, storage tanks, process tanks, drying drums, and the like. For installations such as pot heaters, platen presses, plastics presses, large outdoor steam lines, and the steam mains to engines, turbines, or pumps, the bucket type of trap is to be preferred because of its rugged construction and because large volumes of condensate can be removed quickly.

31. Q. From the maintenance point of view does chrome plating of rams pay for itself?

A. Kotich. I believe that hard chrome plating of rams will definitely pay for itself in two ways: (1) there is a reduction in friction between the packing and ram; and (2) the hard surface is less subject to damage. The two plated rams we have are in excellent condition after several years of surface, and the packings on these rams have consistently outworn those on other presses.

32. Q. How frequently should press platens be resurfaced for good contact with molds?

A. Holman. We resurface platens only when flash difficulty is encountered, when a new or different-size mold is to be run in the deck, or when the platen is damaged. We specify only a 50% clean-up with no area larger than ½ inch in diameter.

33. Q. What is the best method to check roll box temperatures?

A. Holman. The old-fashioned method, by hand, is the most practical. On critical bearings special alarm units can be installed, and simple facilities are now available for shutting off the motor if certain bearings exceed preset temperatures.

34. Q. What is the best practice on safety cups for mills?

A. Holman. We have both cast and steel shear disk-type safeties, and prefer the steel shear disk for lower cost, quicker replacement, and reliability. We are converting, however, to a new all-hydraulic type which consists of a pair of hydraulic caps, a hydraulic pressure switch, and a pressure gage. The switch is adjusted to open the motor circuit at excessive bearing loads, and the pressure gage permits the operator to load the mill to capacity with safety. At overloads the motor circuit is opened, and the mill stops instantly. As soon as the load is cleared, the mill can be restarted in the usual manner.

A. Uhrich. As far as we know, there is no best practice. We use a shear disk whose strength is a compromise between the load application at one end of the roll and the load in the middle of the roll.

35. Q. Are there any special maintenance problems on the adjustable camelback heads?

A. Uhrich. We have had nothing that could be called a special problem, but several parts were made stronger to withstand the pressures our stocks developed. Normal wear and tear on the head consists of stripped threads on the adjusting screws, and an occasional bent gate or blade.

36. Q. Do you have less problems with a drilled or open-center type of platen?

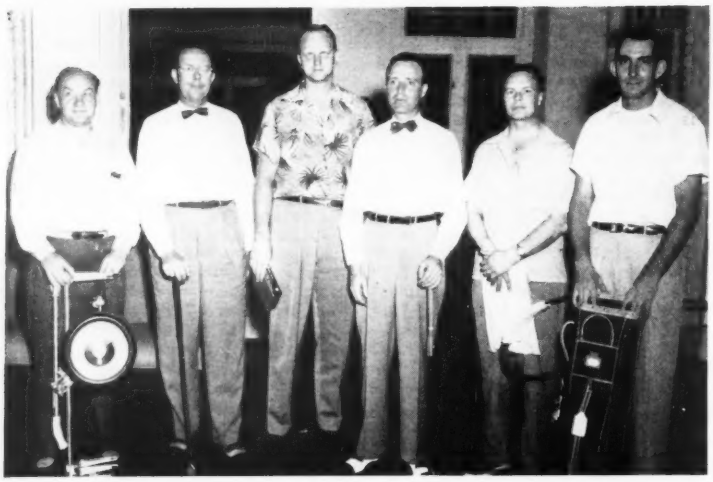
A. Uhrich. We have nothing that could be called a maintenance problem on either type.

More Group Outings

Golf for Quebec Group

THE Quebec Rubber & Plastics Group held a golf tournament on June 19 at the Granby Golf Club, followed by a cocktail party and dinner at the Windsor Hotel, Granby, P.Q., Canada. Some 95 members and guests participated in the tournament; while approximately 120 attended the dinner.

Low gross prize winners in the tournament were: Murray Hayes; N. B. Roberts, Polymer Corp.; and C. P. Dearth, Bolta Plastics, Ltd. Other prize winners included: most honest golfer, Wilfred Grignon, Dominion Rubber Co., Ltd.; loser of most golf balls, Harry Kushnarof; and best looking sitting-bull, John Ramsay, Miner Rubber



Participants at the Fort Wayne Rubber & Plastics Group Golf Outing Included (*L to R*) Wm. J. Johnson; Wilbur Hippensteel, Brown Rubber Co.; Paul Lantz, Syracuse Rubber Products Co.; John Ledden, E. I. du Pont de Nemours & Co., Inc.; James Dunne; and Wayne Place.

Co., Ltd. Arrangements for the tournament and dinner were handled by Ed May, Naugatuck Chemicals, assisted by Dick Harrowing, Harold Loiselle, and Bill Blundell and Bill Halsall, both of Dominion Rubber.

The election of Harold Loiselle, Northern Electric Co., Ltd., as the new chairman of the Group was announced at the dinner. Three new members of the executive committee were also named, as follows: Stuart Aikman, Monsanto Chemical Co. of Canada, Ltd.; John MacDonald, Canadian Industries, Ltd.; and Ted Bibby, Harrisons & Crosfield, Inc.

Second Outing for Fort Wayne

THE Fort Wayne Rubber & Plastics Group held its second annual golf outing on June 12 at the Tippecanoe Lake Country Club, Leesburg, Ind. A total of 147 members and guests took part in the program which included golf, softball, horseshoe pitching, and swimming in the afternoon, followed by a dinner and the distribution of golf and door prizes.

First-prize winners in the golf tournament follow: low gross, Wayne Place, Jasper Rubber Products, Inc.; longest drive, Al Laurence, Phillips Chemical Co.; closest to pin, James Dunne, C. P. Hall Co.; and high gross, Gerald Goyer. Numerous other golf prizes were awarded, including 17 prizes in the kickers' handicap. A total of 67 door prizes was distributed; the major prizes were won by George Darsie, General Electric Co.; Charles P. Bender, General Tire & Rubber Co.; and Marvin Weintraub, H. Muehlstein & Co. Arrangements for the outing were handled by a committee headed by Wm. J. Johnson, Goshen Rubber Co.

Record Crowd for Boston Group

A RECORD attendance of 530 members and guests, excellent facilities, bright summer weather, and good fellowship combined to make the seventeenth annual summer outing of the Boston Rubber Group, held June 19 at Andover Country Club, Andover, Mass., the most successful in the Group's history. The program included an afternoon of golf and other games, followed by dinner and distribution of contest and door prizes. Arrangements for the outing were handled by J. E. Williamson, Tyer Rubber Co., assisted by A. I. Ross, American Biltrite Rubber Co., and H. A. Atwater, Malrex Chemical Co.

First-prize winners in the golf tournament were: low gross, J. Simpson, Hodgman Rubber Co.; low net, B. Boonstra, Godfrey L. Cabot Co.; nearest to pin, M. H. Boden, Granet Corp.; long drive accuracy, A. Midyette, C. F. Church Co.; high net, B. H. Little, Hercules Powder Co.; high gross, J. Ingraham, Hercules; and kickers' handicap, L. D. Hatch, Raffi & Swanson, Inc. In the other contests first-place prizes were won by the following: tub and ball game, Paul Bratenas, Hood Rubber Co.; darts, H. Naidus, American Polymer Corp.; horseshoes, Walter Mason and William Butler, both of Haarts-Mason Co.; softball, Stedfast Rubber Co. team; and putting, Jack Bernstein, Bay State Adhesives Co. Many other prizes were awarded in the sporting contests, and, through the contributions of 187 rubber and supplier companies, everyone attending the outing received a door prize. The grand door prize, a set of Kroyden putters, went to W. E. Casey, Woburn Degreasing Co.

Additional Experimental GR-S Polymers and Latices

THE additions and changes in the list of experimental GR-S polymers and latices authorized by the Office of Synthetic Rubber, Reconstruction Finance Corp., during the period from January 31, 1953, to June 30, 1953, are given in Table 1.

Table 2, when added to those materials described in Table 1, is a complete list of currently active experimental polymers. Those not shown in either table have been discontinued or replaced by permanent numbered polymers.

Normally, experimental polymers will be produced only at the request of the consumers, and 20 bales (one bale weighs approximately 75 pounds) of the original run will be set aside, if possible, for distribution to other interested companies for their evaluation. The 20 bales, when available, will be distributed in quantities of one bale or two bales upon request to the OSR Sales Division, or will be held for six months after the experimental polymer was produced, unless otherwise consigned before that time. Subsequent production runs will be made if sufficient requests are received.

All of these new polymers are experimental only, and OSR does not make any representations or warranties of any kind, expressed or implied, as to the specifications or properties of such experimental polymers or the results to be obtained from their use.

TABLE 2

X-617 GR-S Latex	X-708 GR-S
X-619 GR-S Latex	X-710 GR-S Latex
X-633 GR-S Latex	X-711 GR-S Latex
X-667 GR-S Latex	X-733 GR-S
X-684 GR-S Latex	X-734 GR-S Latex
X-695 GR-S Latex	

TABLE 1

X-Number Designation	Polymer Description	Remarks
X-748 GR-S	Butadiene/styrene charge ratio 71/29 adjusted to yield 24.0±2.0% bound styrene; rosin acid soap emulsified; persulfate catalyzed; 122° F. reaction temperature; 72% conversion; carbamate shortshop; Polygard stabilizer; glueacid coagulated; Mooney viscosity, 70–85 (ML-4).	Identical with GR-S 1022 except carbamate is shortshop instead of hydroquinone, and the polymer does not receive special finishing after coagulation. *Will replace GR-S 1022.*
X-749 GR-S Latex	Butadiene/styrene charge ratio 70/30 adjusted to yield 24.0±2.0% bound styrene; 65/35 rosin/fatty acid soap emulsified; peroxamine activated; 50° F. reaction temperature; 60% conversion; potassium oleate stabilized; carbamate shortshopped; mean Mooney of contained polymer, 75 (MS 1.5). Latex is heat concentrated. Total solids, approximately 60%.	High solids latex for foam sponge. *Possible replacement for X-619, X-684 GR-S latices.*
X-750 GR-S	Butadiene/styrene charge ratio 70/30 adjusted to yield 23.5±1.0% bound styrene; rosin acid soap emulsified; sulfoxylate activated; 41° F. reaction temperature; 60% conversion; carbamate shortshopped; staining stabilizer; salt-acid coagulated; mean raw Mooney, 52 (ML-4).	Identical with GR-S 1500 except for the sodium formaldehyde sulfoxylate activation system instead of sugar-free iron. *Replaced by GR-S X-754.*
X-751 GR-S	50 parts HAF black +100 parts 23.5% bound styrene polymer; sugar free; iron activated; rosin acid soap emulsified; 41° F. reaction temperature; 60% conversion; carbamate shortshopped; staining stabilizer; salt-acid coagulated; mean Mooney of masterbatch (compounded), 74.0 (ML-4).	Similar to GR-S 1600 except black slurry prepared without dispersing agent, and steam jets are employed to prepare black slurry and mixing the slurry with latex. *Owing to production difficulties this experimental polymer is not available.*
X-752 GR-S	50 parts HAF black +100 parts 23.5% bound styrene polymer; sugar free; iron activated; rosin acid soap emulsified; 41° F. reaction temperature; 60% conversion; carbamate shortshopped; staining stabilizer; salt-acid coagulated; mean Mooney of masterbatch (compounded), 74 (ML-4).	Similar to GR-S 1600 with masterbatch prepared in same manner as X-751 except Marasperse CB used in preparation of black slurry. *Owing to production difficultirs this experimental polymer is not available.*
X-753 GR-S Latex	Identical with GR-S X-667 latex except activated with sodium formaldehyde sulfoxylate instead of polyamine.	Produced to determine suitability of sulfoxylate activation in low-temperature polymerized latices. *Possible replacement for GR-S X-667.*
X-754 GR-S	Butadiene/styrene charge ratio 70/30 adjusted to yield 23.5% ±1.0% bound styrene; rosin acid soap emulsified; sulfoxylate activated; 68% conversion; staining stabilizer; salt-acid coagulated; mean raw Mooney, 52 (ML-4).	Identical to GR-S X-750 except the conversion is 68% rather than 60%. *Made available for consumers' evaluation of higher conversion and sulfoxylate activation of cold polymers.*

NEWS of the MONTH

The Senate bill for the disposal of the government's synthetic rubber plants, S. 2047, passed that house on July 22, but because it was sufficiently different from the House version, House and Senate conferees were scheduled to get together during the week of July 27, with the hope that a compromise bill could be arrived at and sent to the President for his signature in early August. The Senate bill included four amendments to the original bill as a result of a strong report issued by the Democratic minority of the Senate Banking & Currency rubber subcommittee. (NOTE—Congress approved and sent to the White House, July 30, a compromise bill giving either house the right to veto individual plant sales if the remaining plant sales produce 500,000 tons of GR-S and 43,000 tons of butyl, requiring the Attorney General to submit formal opinion on violation of anti-trust laws, and extending the disposal period to February 1, 1955.—ED.)

The Bureau of the Budget has finally decided to limit the Reconstruction Finance Corp. to an 85,000-long-ton inventory of GR-S for the current fiscal year. At the same time, RFC raised the price of butyl rubber to 22¢ a pound, effective July 17, and increased its uniform freight charge for butyl and GR-S by 0.1¢ a pound. RFC will shut down its alcohol butadiene plants on July 31, thereby reducing its projected production of GR-S about 100,000 tons.

RFC Administrator K. R. Cravens told a Congressional committee on June 30 that expansion of synthetic rubber capacity stands a "better chance" under private industry.

The United States Court of Appeals for the District of Columbia has ruled that tire manufacturers and dealers are entitled to a District Court trial on their charges that the Federal Trade Commission's quantity discount limit order on replacement tires and tubes is illegal.

The synthetic rubber labeling bill, H. R. 3368, was shelved by a House Interstate & Foreign Commerce subcommittee after vigorous opposition was voiced by the industry and some executive branches of the government.

The Rubber Manufacturers Association, Inc., received an "Award of Merit" from the American Trade Association Executives in recognition of the Crude Rubber Quality Seminars conducted by the RMA in 1952.

It appears as though the government tire testing program at Camp Bullis, Texas, recently condemned by a House Armed Services subcommittee on defense activities, will be drastically reduced or curtailed altogether. The House Appropriations Committee has denied funds for this work, while the Senate Appropriations Committee voted to restore the funds. RFC has already cut its contribution from about $1.5 million to $450,000, and if no Army Ordnance funds are available, such tire testing as is necessary may be done under contract by private industry.

Washington Report by Arthur J. Kraft

Synthetic Plant Disposal Bill Passed in Senate; Compromise Bill by August Possible

The synthetic rubber facilities disposal bill had a stormy time of it in the Senate last month, with hopes for its passage before adjournment rising and falling sharply and frequently. Hopes are high, at the moment, that House-Senate conferees will report a bill in time for final action in both chambers of Congress this year. There were significant differences between the bill approved by the House on June 25 and the bill approved by the Senate on July 22. Whether the differences prove serious enough to prevent their reconciliation in conference is yet to be seen. The general assumption is that the differences will be composed in fairly short order and some sort of compromise bill will clear both chambers and reach the White House, for the President's signature, early in August, at the latest.

Both houses of Congress approved by overwhelming margins somewhat differing versions of what is, in essence, the same bill. There were few votes against disposal, and even those who voted against the bills did so because of misgivings that the bills would fail to achieve disposal on terms that would protect the public interest. The House approved its bill on a voice vote, but its sentiments were recorded when it rejected a motion to send the bill back to committee by a 317 to 58 roll-call vote, a better than five-to-one margin. The Senate, after adopting several amendments sponsored by the Democratic leadership, approved its bill by a 65 to 16 vote, or better than four-to-one. In each case the dissenting vote came largely from the "liberal" Democratic wing, whose remedies for making the bill virtually "monopoly-proof" were rejected as too drastic by the dominantly "conservative" majorities of both houses.

House sponsors of disposal legislation proved better able to fend off the attacks upon their bill than was the case in the Senate. The bill unanimously reported to the House floor by the Armed Services committee of the House was championed by Rep. Paul W. Shafer (Rep., Mich.), its author and an acknowledged expert on rubber policy. Guiding his bill through the House, Shafer was compelled to accept only one opposition amendment, increasing the interest rate from a flat 3% to "not less than 3.5%" on the purchase money mortgages which would be made available by the government to purchasers of the rubber plants.

The Senate Minority Report

In the Senate, Homer E. Capehart (Rep., Ind.) was faced with the more difficult task of seeing home safely a bill which had been roundly condemned by a solid phalanx of the Democrats serving on his Senate Banking & Currency committee. The bill had cleared the committee by a slim two-vote margin, as the six Democrats, acting under instructions of Senate Minority Leader Lyndon B. Johnson, of Texas, lined up against it. Only one of the six, the "conservative" A. Willis Robertson, of Virginia, withheld his signature from the stingingly worded minority report filed with the Senate on July 14. That report rebuked the Republican committee majority for reporting a measure that threatened to turn disposal into a "forced sale" or "fire sale"—a "giveaway, throwaway" of public properties worth a good deal of money. In the week before the bill came up for Senate floor consideration, the rubber community had been deep in gloom, fairly convinced that the Democratic leadership, commanding about half the Senate's voting strength, was intent on blocking disposal legislation unless the Democrats were permitted to dictate a wholesale rewriting of the bill.

During that week the rubber community, joined by interested petroleum firms, appealed to the Senate not to block the legislation. The apparent partisan front of the opposition melted, and in the 48 hours before the bill came up for debate agreement was reached between Senator Capehart and the Democratic leadership on three major amendments. The result of this advance agreement left the hard core of opposition, the predominantly Democratic "liberal" wing, a well-isolated minority when the voting got under way. After eight hours of floor debate the bill was approved with only one additional amendment forced through over Senator Capehart's strenuous objections.

Senate Amendments

Three of the four major amendments (there were a couple of technical amendments dealing with language, but not substantive matters) drew immediate criticism from Representative Shafer, who, thereupon, asked the House to take its bill to conference committee, rather than accept the Senate bill. The only amendment to which Shafer did not take exception was one of those agreed to in advance of the Senate debate by Senators Capehart and Johnson and Burnet R. Maybank (Dem., S. C.), the ranking minority member of the Banking committee and a man who commands a strong following in the "conservative" camp of both parties. That amendment provided that when the civilian disposal commission reported back to Congress on the results of its negotiations with prospective purchasers, any Senator or Congressman, simply by introducing a resolution to disapprove of the proposed sales, could force a vote in his chamber on the disapproval resolution. Prior to acceptance of that amendment it was not clear that either

the House or the Senate bill would require a vote, a situation which the Democratic leadership feared might permit a Republican majority to block such a resolution in the final review period.

That amendment left unchanged a provision of the bill which would permit the proposed sales to take effect, if neither chamber exercised a veto within 30 days after the Disposal Commission submitted its report. The veto would have to be passage of a resolution disapproving the Commission's report in toto. It was left to a subsequent and more controversial amendment further to modify the Congressional review procedure. This amendment was the one forced through by a 47-to-35 vote over the objections of Senator Capehart. Introduced by Senator Russell B. Long (Dem., La.), and strongly supported by Senator Johnson, the amendment provided for an "item" veto instead of the "all or nothing" veto in the Shafer and Capehart bills. The Long amendment, which picked up the support of six Republicans, would allow either chamber to disapprove of some proposed sales, while allowing others to go through. Particular sales deemed unsatisfactory by a majority of either chamber could be blocked without jeopardizing the others. After adopting this amendment the Senate also agreed, without any debate, to extend the period for Congressional review to 60 days so as to leave time for a possible vote on each individual proposed sale —a possible 28 in all, one on each plant.

Senator Capehart objected to the Long amendment on the ground that rejection of some sales could result in the disposal of insufficient capacity to meet the bill's requirement that plants capable of producing 500,000 long tons annually of GR-S be sold, a provision designed to assure sufficient rubber production to meet the needs of small consumers dependent on others to supply them. Senator Johnson retorted that the present Rubber Act requires only 220,000 tons of production annually, that the 500,000-ton figure will not provide so strong a protection of the smaller consumer as would the Long amendment, which is intended to strengthen the hand of Congressional champions of prospective small company purchasers of the rubber facilities. Senator Johnson said a "great many people are fearful" of a monopoly of synthetic rubber in the hands of the "Big Four." He also expressed the belief that some of the plants will not be sold, that the large rubber firms intend only to "skim the cream"—buy the better plants and leave the government holding the rest. But, probably his most telling argument and the one that swung a majority to the support of the Long amendment, was an appeal to the pride of the Senate.

"Why must we take all 28 sales? If there is one bad egg, let the Senate take it out. We say let the Senate exercise its individual judgment, but the Senior Senator from Indiana says, 'Thou shalt not!'"

Senator Johnson added that Senator Capehart's position seemed to indicate a lack of faith in the ability and intention of the Senate to ferret out bad sales from the good. This argument prevailed over the dire warnings of Senator Capehart that private industry would not bid for the plants if Congress held the threat of an "item" veto over the head of each prospective buyer. It was the only time in two weeks of committee hearings and a day of Senate debate that Capehart showed signs of impatience. He repeatedly admonished Senators Long and Johnson with the words, "You're not thinking straight."

Senator Long replied that if a number of sales were turned down by Congress, leaving an insufficient capacity of rubber to meet the needs of all users, Congress could instruct the Disposal Commission to make a fresh start or negotiate with others.

Shafer shares the belief of Capehart that the "item" veto amendment would discourage the entry of bids on the facilities, even by those intending to enter bids which would be irreproachable as to the terms which the public would demand. A prospective buyer of a copolymer plant would hesitate to enter a bid if it seemed possible that Congress might approve a sale to him, while turning down the proposed sale to someone else of a butadiene plant, on which he must depend for the raw material to operate. This action would leave him with a copolymer plant and no material to operate it.

CALENDAR

Aug.	21.	Philadelphia Rubber Group. Annual Outing, Cedarbrook Country Club, Philadelphia, Pa.
Sept.	9-11.	Division of Rubber Chemistry. A. C. S. Sherman Hotel, Chicago, Ill.
Sept.	12.	Connecticut Rubber Group. Annual Outing. Paterson Club, Fairfield, Conn.
Sept.	17.	Southern Ohio Rubber Group. Engineers' Club, Dayton, O.
Sept.	19.	Northern California Rubber Group. Summer Picnic. Adobe Creek Lodge, Los Altos, Calif.
Sept.	28-30.	Committee D-20, ASTM. Chalfonte-Haddon Hall, Atlantic City, N. J.
Sept.	30-Oct. 2.	Committee D-9, ASTM. Chalfonte-Haddon Hall, Atlantic City, N. J.
Oct.	1.	Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.
Oct.	6.	Buffalo Rubber Group, Hotel Westbrook, Buffalo, N. Y. The Los Angeles Rubber Group, Inc. Hotel Statler, Los Angeles, Calif.
Oct.	8.	Northern California Rubber Group.
Oct.	14.	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Oct.	16.	New York Rubber Group. Henry Hudson Hotel, New York, N. Y. Boston Rubber Group. Boston, Mass.
Oct.	21.	Washington Rubber Group. Washington, D. C. New York Section, SPE. Hotel Gotham, New York, N. Y.
Oct.	27.	Association of Consulting Chemists & Chemical Engineers, Inc. Twenty-Fifth Anniversary and Annual Meeting, Hotel Belmont Plaza, New York, N. Y.
Nov.	13.	Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.
Nov.	18.	Washington Rubber Group, Washington, D. C. New York Section, SPE. Hotel Gotham, New York, N. Y.
Nov.	19.	Rhode Island Rubber Club. Metacomet Golf Club, East Providence, R. I.
Nov.	30-Dec. 5.	Exposition of Chemical Industries. Commercial Museum and Convention Hall, Philadelphia, Pa.
Dec.	11.	New York Rubber Group. Christmas Party. Henry Hudson Hotel, New York, N. Y. Boston Rubber Group. Christmas Party.
Dec.	12.	Southern Ohio Rubber Group. Christmas Party. Miami Valley Country Club.
Dec.	15.	Buffalo Rubber Group.

Probable Conference Action

Of the 14 conferees named to iron out differences between House and Senate versions of the disposal legislation, only three are avowed supporters of the Long amendment, Senators Maybank, Robertson, and Douglas, the Democratic members of the Senate conference group. Each of them voted for the amendment on the Senate floor. Robertson voted against two amendments presented by Douglas to impose a stricter anti-monopoly feature on the Senate bill, a limitation on the number of plants which might be sold to the large tire companies. Maybank declined to vote on the harsher of these two poposals, but voted for the other. Both were roundly defeated, one by 16, and the other by 12 vote margins. The four Republican Senate conferees voted against the Long amendment as well as the Douglas amendments and their position on the Long amendment, in conference, may be expected to be identical to that of the House conference delegates, that is, outright opposition to the amendment. Judging from the Senate debate and votes, it would appear that the Senate Democratic conferees, unless given a better explanation of the pitfalls inherent in the "item" veto proposal than Capehart was able to give them, will put up a stiff fight for the Long amendment in conference. At the moment this issue appears to be the toughest facing the conferees.

The other major amendments facing House opposition appear less difficult obstacles, more amenable to compromise. One of these would stretch out the disposal period to February 1, 1955, eight months beyond the target date set out in the House bill, which set a May 1, 1954, deadline for the civilian Disposal Commission to file its report with Congress. The House conferees are expected to go along with a stretch-out, provided it is of a "permissive" and not a "mandatory" nature. Under the bill approved by the Senate it is mandatory—that is, the Commission is required to hold off reporting to Congress until February 1, 1955. This is achieved by requiring the Commission to hold open the period for accepting bids on the facilities for six months after the properties are advertised for sale; negotiations must go on for at least seven months after the bidding deadline; and the Attorney General must be given at least 90 days in which to render judgment on whether proposed sales violate the anti-trust laws. The House conferees are agreeable to these time periods, provided actual experience shows them to be necessary. But they don't want the legislation to compel the Commission or the Attorney General to use up all this time, if they can manage to wind up their respective functions more quickly.

The stretch-out amendment was one of those agreed upon by the Republican and the Democratic leadership in the days immediately preceding consideration of the bill on the Senate floor. Capehart assented readily to its adoption and publicly explained that a longer period should have been in the bill in the first place, before it left his committee. The committee bill had provided a June 1, 1954, reporting date—and it was this early date that aroused such instant and ferocious denunciation of the bill in the minority report. Leaving out the epithets, the Democrats charged that the early date would make disposal a rush job, leaving the Commission inadequate time to sell the plants while observing the requirements imposed on the Commission to protect small users and get full, fair value for

the facilities. The Democrats also charged that the original June 1, 1954, deadline left less than three months for prospective bidders to inspect the plants, arrange for financing and submit bids, a prohibitive handicap, in their view, to small firms, or groups of small firms, interested in buying a rubber facility. It is difficult to see, beforehand, why this issue of a permissive as against a mandatory reporting date should raise any serious problem. There seems to be general agreement that the Commission may be rushed too much if required to abide by a May or June, 1954, target date. A new Congress will reconvene on January 3, 1955. It is obvious that if Congressional review is to be postponed at all, it will have to be postponed until Congress gets back to Washington after its five- or six-month absence from this city, including Election Day in November.

The remaining major amendment, which also was acceded to in advance of the debate, relates to the Attorney General's role as anti-trust watchdog over the proposed sales. Here Senator Capehart threw out his milder language and, under pressure from the Democratic leadership, accepted language taken from the 1944 Surplus Property Act, requiring the Attorney General to certify that the proposed sales do not violate the anti-trust laws. The House conferees are expected to stand up for their own provision, which requires the Commission to obtain the advice of the Attorney General on anti-trust questions and communicate his views, favorable or unfavorable, as part of the disposal report. The bill reported to the Senate required the Commission to obtain guidance from the Attorney General as to the type of disposal program which will foster a new competitive industry, that guidance being given throughout the disposal period. This point gives the Attorney General the broader role sought for him by RFC, although less power than the Surplus Property Act language, in the disposal decisions.

The House conferees apparently are convinced that the provision substituted on the Senate floor would give purchasers of the plants a very strong weapon to fend off future anti-trust action relating to their synthetic rubber operations. Shafer has pointed out that the Justice Department's anti-trust chief, Stanley Barnes, when he testified before the House subcommittee in May, urged against requiring the Attorney General to stamp his advance approval on proposed sales, and for the same reason. The Senate Democrats, on the other hand, want the Attorney General's imprimatur on proposed sales he favors, or, if he finds some that are not in accord with anti-trust policy, they want him to name them in writing. They want this information for two reasons, both of them related. One, they believe the big rubber companies already exercise something close to monopolistic control of the rubber industry, and they don't believe the Senate Republican majority will discern monopoly dangers in the disposal program unless a Republican Attorney General paints that danger in bright letters, "This sale would violate the anti-trust laws." Two, the Democratic leadership is looking ahead to the presidential election of 1956, and to later years, and if the synthetic rubber industry should develop monopolistic evils, the Democrats want to be able to pin the responsibility on the Republican Party. It is conceivable that a Republican Attorney General might not see monopoly dangers where the Democrats see them.

The Democrats, while voting for disposal, "made a record" of considerable proportions on this potential monopoly danger. Perhaps no phrase received as much mention in the Senate debate as "Big Four" unless it was Senator Douglas's "Big Four-and-a-half"—a left-handed acknowledgment that The General Tire & Rubber Co. is not a small enterprise. A great many more Democrats, along with a few Republicans, joined in expressing doubts about these large tire companies, although most of them refused to go along with the Douglas amendments which avowedly had the purpose of weakening the dominant position of the large firms in the industry—lessening the degree of their dominance.

The effect of all this was to draw from the Republican sponsors of the disposal bill somewhat stronger avowals of their determination to protect small rubber fabricators and the public interest than might have been expected without the harassing and prodding to which the Democrats subjected the Senate majority. Senator Capehart, in committee hearing, in the committee majority report and again on the Senate floor, repeatedly asserted that he would reject forthwith any disposal program that failed to meet the criteria of the legislation—an assured supply of rubber to small users, full, fair value for the plants, and competition in the synthetic rubber industry. He went much further than Shafer on the question of what constitutes an adequate return on the plants. Shafer bandied about figures like $300 million, then stopped getting specific and said fair value is what a "willing buyer will pay a willing seller."

Senator Capehart, on the other hand, pointed to the $518 million the government had put into its 28 plants and said the Disposal Commission should hold out for a return "pretty close to, if not above" that figure. He and other Banking committee Republicans went on record with a statement that the plants today are a "going concern" and cited an estimated $62 million profit for the past fiscal year as proof. Senator Douglas ridiculed industry arguments that the plants had lost considerable value through obsolescence and said, on the contrary, that their value is considerably greater today than when originally erected 12 years ago. At current replacement costs, he told the Senate, the 28 plants would cost about $1 billion to duplicate.

All of this will make urgent, and perhaps harrowing, reading for the yet-to-be-appointed three-member Disposal Commission and perhaps for some of the firms considering the purchase of synthetic rubber facilities. Congress has laid down the terms for disposal. Senators, wherever they may fall in the political spectrum, have one thing in common, a healthy respect for the political facts of life. The salient political fact impinging on the proposed sale of the rubber plants is that Congress must take the final responsibility for the results only a few months before the 1956 elections. Given the record of the recent debates, the Senate, and the House also, will be looking hard for evidence of a "giveaway" or jeopardy to small business.

Other Features of the Legislation

Other important features of the disposal legislation, not subjected to criticism in the Senate debate, follow:

Each bill lists a number of criteria which the Commission is directed to follow in evaluating proposed sales. The House bill requires negotiation on the basis of the highest bid on each facility; while the Senate bill permits negotiations at a price greater or less than the highest amount offered. Other criteria are the technical competence of the purchaser; no unreasonable control by any purchasers as a result of disposal; evidence of good faith of the purchaser to produce rubber; fair value for the facilities; strengthening of national security by the sales; sale of sufficient capacity to produce 500,000 tons of GR-S and 43,000 tons of butyl annually. The Senate bill contained additional protection for small users.

Besides naming an offering price, the bids must contain data on the prospective purchaser. The Senate bill requires the bids to include an acceptance of a national security clause and a statement of willingness to make rubber available to small business. The House bill requires bids must be accompanied by cash or bonds equal to 10% of gross bid, but not exceeding $500,000 for each facility. The Senate requires a deposit of 2.5% of the gross bid, not exceeding $250,000 per facility. The deposit will be returned if no sale is made; otherwise it is applied to the purchase price. Both bills require a 25% minimum down payment, with the balance to be paid over 10 years, under government purchase money mortgages bearing a uniform interest rate of not less than 3% (Senate bill), or interest, not necessarily uniform for each buyer, of not less than 3.5% (House).

GR-S Production Reduced; Butyl Price Raised

The Bureau of the Budget, after several months' consideration, came up with a final order during July, limiting the RFC to an 85,000-long-ton inventory of GR-S for the current fiscal year. RFC, which has been accumulating inventory at a rapid pace, responded to the new move by shutting down its alcohol-butadiene plants on July 31, thereby reducing its projected production of GR-S about 100,000 long tons a year.

At the same time RFC raised the price at which it sells butyl rubber from 20.75¢ to 22¢ a pound, effective July 17, and increased its uniform freight charge for butyl and GR-S by 0.1¢ to 1.1¢ a pound in carload quantities and 1.7¢ a pound on less than carload quantities.

The cutback in GR-S output will leave RFC with an operating capacity of about 660,000 long tons a year, all of it utilizing petroleum butadiene feedstock. Since the 100,000 tons of alcohol-based GR-S were sold at a loss, the shutdown of this production should improve RFC's profit picture this year.

RFC has never disclosed the average unit cost of producing GR-S from petroleum butadiene or the comparable figure for GR-S produced from alcohol butadiene. It is known, however, that RFC makes a profit of several cents a pound on petroleum-based GR-S, selling the material at 23¢ a pound. The agency made a smaller profit on butyl, prior to increasing the price by 1.25¢ a pound on July 17. Officials stated that the increase in the price of butyl is designed to bring the unit profit on sales of that-type rubber to a point where it will equal, within a fraction of a cent, the unit profit realized on petroleum-based GR-S.

The agency expects to produce and sell in the neighborhood of 80,000 to 85,000 tons of butyl in the current fiscal year—or all it can produce. Sales of GR-S, well over the 60,000-ton-a-month level a few months ago, receded to slightly above 50,000 tons in June and about 50,000 tons in July. With tire companies shutting down plants during August vacation time, August consumption is expected to be relatively low. RFC, at the end of July, held about 66,000 tons of GR-S in inventory, a sharp rise over the 25,000 tons on hand four months ago.

While it may cost about $1 million to shut down the three alcohol-butadiene lines which were operating during July, it appears that this method of trimming production, to remain within the 85,000-ton inventory ceiling, is more economical than continuing high-cost alcohol-butadiene production and trimming production sharply of lower-cost petroleum-based GR-S.

The shutdown of the alcohol-butadiene facilities was disclosed by RFC at a meeting with its rubber industry advisory committee on July 17. At that meeting, RFC Rubber Director E. D. Kelly informed the committee that the agency has no intention of changing the price at which it sells GR-S, either by raising or lowering it from the present 23¢ a pound. At the same time RFC officials emphasized that the agency is unable and unwilling to accumulate a heavier inventory of GR-S than the 85,000 tons permitted by the Budget Bureau.

RFC officials asked the industry committe to report back on July 28 with some forecasts of rubber demand and with suggestions on what steps should be taken, assuming sale of the synthetic rubber facilities is permitted by Congress, to provide against possible shortages of synthetic rubber in the period following plant disposal. RFC also asked for industry suggestions on RFC sales policy.

Industry comments on the demand outlook at the July 17 meeting pointed to a general expectation that new rubber consumption in calendar 1953 will fall short of the 1,399,000 long tons forecast by the RMA at the beginning of the year. There was some question as to whether the current high output of automobiles, which has brought with it an exceptionally large demand for original equipment tires, will be sustained throughout the year. It was noted, however, that auto makers may introduce their 1954 models earlier than usual, possibly in early autumn, and that may result in maintaining demand for original equipment tires at current levels. The tire company executives felt confident that replacement demand will continue high, meeting the sales forecasts made at the beginning of the year. At this writing, however, RFC has only a fair idea of the sales outlook for the current quarter and no idea of the demand it will be called upon to satisfy in subsequent months. There is evidence that favorable prices for natural rubber have resulted in some switches from synthetic to natural, although not on a major scale. The switching, however, has been significant enough to show up in RFC's monthly sales results.

RFC, in hearings before the Senate Banking committee on disposal legislation and before the House Appropriations committee on its budget, firmly opposed industry suggestions that the government accumulate a 200,000-ton inventory of GR-S against possible shortages incident to disposal. The agency has agreed, however, that should private industry desire to build up heavy inventories of its own, RFC will produce the rubber needed to supply this requirement. It seems extremely doubtful that the rubber companies will take on this burden, since it means tying up considerable capital. Rubber manufacturers, moreover, customarily carry very small inventories of rubber—whether it be natural, synthetic or reclaim. Suppliers of these raw materials customarily carry what inventory is necessary to assure a continuous flow of rubber products from factory to consumer.

It may be recalled that in April it was reported here that the government, or some in government, held the view that if RFC were to take on the responsibility of building a large inventory of GR-S, it should be permitted to raise the price of GR-S. The reasoning was that accumulation of a large inventory would require utilizing alcohol butadiene on a heavy scale; rubber made from alcohol butadiene is a losing proposition on the balance sheet with GR-S selling at 23¢ a pound; accumulation of a heavy GR-S inventory could not be justified as necessary to regular operations, but only to protect the consuming industry against future shortages, which might or might not arise; and, therefore, if the consuming industry wanted such protection (against shortages and a resultant sharp price increase in natural rubber), it should be willing to help pay for it.

This view of the matter, originally ascribed to the Treasury Department, found support in the Budget Bureau and in RFC. Administrator Cravens, of RFC, took a strong position against requiring RFC to finance a heavy inventory in his appearances before Congressional committees in late June. It now seems fairly evident that the decision against accumulating a large government inventory has been made with finality. Since the price increase for GR-S was predicated on RFC operating its alcohol-butadiene plants to accumulate a large inventory—and no other consideration—it seems doubtful that the price of GR-S will be increased. A price reduction seems equally doubtful for numerous reasons, including Congressional and Administration concern over the economic impact on Southeast Asia's natural rubber growers, and the Administration's desires to make a high profit on its synthetic rubber operations.

Broadly speaking, RFC's rubber operations will be geared to two objectives: (1) achieving a straight-line production, avoiding sharp ups and downs to the extent possible, and (2) maintaining a reasonable inventory. The two objectives may not be compatible, since RFC already is hard upon the inventory ceiling it must live with in the coming year. This will not leave much room for maneuver, should demand for GR-S fall off. A reduction in demand, given the inventory situation, would force RFC to trim production accordingly. Production would have to follow rather closely the peaks and valleys in demand. That is not straight-line production.

The objectives will be easier to realize if demand for GR-S remains on a fairly even keel throughout the year. The agency, thus far, has not changed its sales program of permitting purchasers to place orders only a month in advance of delivery. RFC officials had suggested that they might require firm orders several months in advance. This suggestion originally came from the House Armed Services committee and was tied to the idea of a large government inventory. However it may yet be considered outside the context of accumulating a large inventory, and on its merits as one method of achieving a steady rate of production.

At the moment, RFC is hopeful of finding a demand for 660,000 tons of GR-S over the current year. With a production at that rate, and an increase in butyl prices and freight charges already in effect, the agency could well take in a profit of more than $70 million. That-size profit was forecast by Mr. Cravens for fiscal 1954, prior to the decisions to shut down the high-cost alcohol-butadiene plants and to raise the butyl price and freight charges.

The shutdown of the alcohol-butadiene units will take most of August to complete, although production will cease on July 31. RFC will be left with some unused alcohol and plans to store the alcohol at the butadiene plants, rather than sell it. The agency also has cancelled contracts for marginal supplies of butylenes, used in making petroleum butadiene. These contracts were for a small quantity and were entered into early this year to replace some butylenes withheld from RFC by the Petroleum Adminstration for Defense, which had borrowed them last summer for its aviation gasoline program. PAD restored these supplies to RFC in February.

Current RFC Output Sales Figures

Sales of GR-S fell off sharply in June to 53,660 long tons, from 60,776 tons in May and 63,083 tons in April, according to figures supplied by RFC. Production, which had run at 68,800 tons in May and 65,300 tons in June, was scheduled at 64,500 tons for July and is expected to drop to about 56,000 tons in August, with the shutdown on July 31 of the government's alcohol-butadiene facilities.

A significant difference between the June and the July production programs is the increased emphasis in July on production of oil-masterbatch rubber. The RFC planned to produce 17,100 tons of oil-masterbatch GR-S in July, as compared with June's scheduled output of 13,300 tons and actual sales during June of 12,019 tons. The intention is to build up RFC's inventory of oil-masterbatch GR-S, since July sales of oil-masterbatch are not expected to approach the month's production of that type.

Here are the figures on RFC's production schedule for July, along with figures for actual sales during June: July production schedule—total GR-S (including latex and oil, but excluding carbon black), 64,500 tons; LTP, 40,000 tons; black-masterbatch (gross weight, including carbon black), 7,535 tons; oil-masterbatch (gross weight, including oil extenders), 17,100 tons; oil-black masterbatch (gross weight, including oil and black), 2,575 tons; GR-S latex, 3,750 tons; butyl rubber, 6,300 tons. Comparable figures on June sales are: total GR-S, 53,660; LTP, 33,247; B.M., 8,736; O.M., 12,019; O.B.M., 1,858; latex, 4,088; butyl, 6,902.

July's scheduled output of butyl is off about 400 tons from June's production because of the scheduled turn around of a unit at the Baton Rouge, La., butyl plant during July. The figures given above for July output and June sales of total GR-S, as noted, include oil extenders. Without oil, these figures would be 60,100 tons for July's scheduled output and 50,470 tons for June's sales. These figures indicate an oil content of approximately 20% for those polymers containing oil extenders.

RFC Heads Say Synthetic Expansion Better under Private Industry

RFC Administrator Cravens told a Congressional committee on June 30 that expansion of synthetic rubber capacity stands a "better chance" under private rather than government operation of the synthetic rubber industry. Cravens made the statement in an appearance before a House Appropriations subcommittee. His testimony, given in closed session, was released to the press on July 8. While discussing the overall RFC budget for fiscal year, 1954 (July 1, 1953, to June 30, 1954), Cravens had the following remarks on RFC's rubber operations:

1. Operating profits from the government synthetic rubber program "will be right around $61 million" for fiscal 1953, the year ended June 30, 1953. He estimated that these profits will be "in excess of $70 million in fiscal 1954. We have accumulated losses of about $165 million as of this date. Next year, if we do make $70 million, that will cut this loss down."

2. Asked by Subcommittee Chairman Gordon Canfield, of New Jersey, to state his explicit views "concerning the adequacy of your proposed inventory of 85,000 tons during this period of transition"—Mr. Cravens made this statement: "We have based our June 30 rubber inventory on the most efficient operation we could attain through fiscal 1954 without regard to the disposition of these facilities. There are some proponents of a high transitory inventory, as you may have heard in both the House and in the Senate. I emphasize this because we have based the budget with no respect to a transitory inventory. If the Congress in the final rubber legislation should say the RFC must build up a 200,000-ton inventory for transition, I would have to revise my budget. Personally, I would hope the Congress would not make any such requirement. We will require industry to use its own funds to build up the inventory rather than the government's funds."

3. On the question of future expansion of synthetic rubber production, Mr. Cravens declared: "I would say from the standpoint of national security, if we have the bulk of this [synthetic rubber capacity—Ed.] in free, competitive enterprise, we would develop more plants. I anticipate more and more demand for synthetic rubber. I would say we would have a better chance for expanding synthetic rubber production than we would under government operation. I am sure there would be an awful hue and cry if I came to Congress and wanted another $100 million to build some more plants."

4. Mr. Cravens also reported the following administrative expenses incurred in the production and sale of synthetic rubber: fiscal 1952, actual, $2,391,765; fiscal 1953, estimated, $2,115,000; fiscal 1954, estimated, $1,920,000. He disclosed that RFC has spent $12,000 for security checks on 57 employes in "sensitive positions" pursuant to Executive Order 10450, issued by President Eisenhower on April 27. Of this sum, $9,000 was chalked up to the rubber program's balance sheet, an indication that about three-fourths of the 57 individuals given security checks were employed in the rubber program. The $12,000 total was given to the Civil Service Commission to reimburse it for the cost of running the security checks. It might be remarked that whatever elements of government subsidy may appear in RFC's operation of the rubber program, running security checks on employes is not an expense likely to occur if and when private industry owns the plants.

Synthetic Rubber Labeling Act Shelved

Solid industry and government opposition to a bill requiring labeling of products containing synthetic rubber was expressed on July 8 at a public hearing on the measure before a House Interstate & Foreign Commerce subcommittee, headed by Rep. Joseph P. O'Hara (Rep., Minn.).

The bill, H. R. 3368, is designed primarily as an aid to persons who might be allergic or otherwise sensitive to synthetic rubber and would require labeling of all products containing synthetic rubber which in ordinary usage make contact with the human body. The committee, meeting in executive session on July 17, decided to shelve the bill for this session. It will not be reported this year. The labeling bill was introduced by Rep. James C. Davis (Dem., Ga.), who had introduced a similar bill in the last Congress, where it ended up in a committee pigeonhole. Indications point to the same treatment in this Congress, which has another year to go.

Opponents of the bill contended that rubber—whether synthetic or natural—has not been shown as a cause of allergies or sensitivities. Persons who complain of irritations from contact with rubber products, industry witnesses indicated, probably are sensitive to some of the thousands of various chemicals used in processing rubber products.

According to industry witnesses, the only way of providing effective protection to consumers (assuming each consumer is aware of all the causes of his allergies) is to identify on a product label all the materials used in processing an article. Aside from the physical impossibility for such items as rubber bands, even limited labeling of some articles would result in raising production costs and thereby the cost of these items to the public, thus penalizing the majority of persons who suffer no allergies traceable to materials used in rubber products.

Opposition witnesses included Charles C. Miller, RMA public relations director; Arthur R. Gow, executive vice president, Seamless Rubber Co.; Frederick W. Sands, industrial hygienist, United States Rubber Co.; Joseph L. Haas, technical director, Hodgman Rubber Co.; Rex H. Wilson, M.D., medical director, The B. F. Goodrich Co.; Albert K. Dannebaum, president, Aldan Rubber Co.; and representatives of the U. S. Public Health Service, the Federal Trade Commission, RFC, the National Production Administration, and Rep. Frazier Reams (Rep., Ohio). Testifying for the bill was its sponsor, Mr. Davis.

Court Trial of FTC Tire Discount Rule Approved

The United States Court of Appeals for the District of Columbia has ruled that 14 tire manufacturers and 35 tire dealers are entitled to a District Court trial on their charges that the Federal Trade Commission's quantity discount limit order on replacement tires and tubes is illegal and should be nullified.

The long-awaited Appeals Court ruling was handed down July 16 and reverses an earlier District Court order which dismissed the suit brought by the plaintiff companies for a permanent injunction against FTC. The Appeals Court stressed that its ruling in no way passes judgment on the validity of the FTC order, which is designed to protect small independent dealers by limiting the price discounts offered by manufacturers to large-volume tire purchasers.

The action puts the case back in the hands of Federal District Judge Matthew McGuire, who had turned down the plaintiff companies' challenge to the FTC order last December on grounds that their complaint was premature. Judge McGuire's position was that the FTC order could not be challenged until it was permitted to take effect and the plaintiffs could demonstrate injury. He supported the government's position that the plaintiffs had failed to exhaust administrative remedies open to them under FTC procedures.

The FTC order was issued in January, 1952, and is based on the "quantity limit" proviso put in the Robinson-Patman act 16 years earlier, but never used by the FTC prior to its application to tire discounts. The FTC order prohibits tire manufacturers from granting discounts greater than the quantity discount customarily offered on a single shipment of one 20,000-pound carload lot of replacement tires and tubes. Among those challenging this order were several mass distributors of tires, including a nationwide chain and an oil company which sells private-brand tires through its retail filling stations.

Since the case was last before Judge McGuire, the political complexion of the FTC has changed. Last December the Commission was about equally divided on the issue, but voted 3 to 2 to defend the tire limit order in the courts. The Democratic members of the Commission who were strongest for the FTC order included John Carson, since replaced by a Republican, and Stephen Spingarn, whose term expires in September. The new Republican majority may, instead of engaging in a long-drawn court test of the validity of the discount limit order, drop the order entirely and perhaps substitute a modified type of discount limitation, such as one based on annual dollar volume of purchases. A limitation, restricting discounts to the amount allowed on sales to purchasers of $600,000 worth of tires annually, has the support of the largest organization of independent tire dealers, National Association of Independent Tire Dealers, Inc. NAITD was never enthusiastic about the more stringent quantity limit ruling issued by the FTC in January, 1952. The FTC order was to have taken effect on April 7, 1952, but has been dormant pending the outcome of the court test.

RMA Receives "Award of Merit"

RMA last month received an "Award of Merit" from the American Trade Association Executives in recognition of the Rubber Quality Seminars conducted by RMA in six cities last autumn. The award, bestowed annually, was received on behalf of RMA by Vice President W. J. Sears, Jr., and Mr. Miller. RMA received the award in competition with other trade associations having an annual budget of $150,000 or more. Similar awards went to trade associations operating on smaller budgets. The awards were made at ceremonies held in Atlantic City on July 20.

The citation accompanying the award honored RMA for its general service to the rubber industry and especially for its campaign to raise the standards among U. S. purchasers of natural rubber and Asian producers and dealers of the grading, inspection, packaging, buying practices, commercial arbitration, and other phases of business dealings between buyers and sellers in international trade. The citation noted that "millions of dollars" had been lost as a result of downgrading of natural rubber and that the educational seminars were designed to rectify this situation.

Judges of the competition were Sinclair Weeks, Secretary of the U. S. Department of Commerce; Laurence F. Lee, president, U. S. Chamber of Commerce; Charles R. Sligh, president, National Association of Manufacturers; Frank L. Mott, president, Association of Accredited Schools of Journalism; and C. C. Balderston, Dean, Wharton School of Finance & Commerce, University of Pennsylvania.

Approximately 2,000 purchasing agents,

compounders, and other rubber company officials, representing some 350 rubber manufacturing firms, attended the seminars. RMA subsequently distributed the papers presented at the seminars as a "Crude Rubber Quality Bulletin" and is about to distribute a textbook covering methods of grading, inspection, etc., for natural rubber.

Previous to receiving an "Award of Merit" this year, RMA had been honored by the same organization in 1947 for its public relations program to encourage wartime conservation of rubber by automobile owners and others.

Government Tire Testing Cut

At this writing (July 24) it looks very much like the government's tire testing program, criticized as a "wanton waste" of public funds by the House Armed Services committee in June,[1] may be severely trimmed, if not dropped entirely.

The House last month, through a rider to the military appropriations bill, prohibited the use of Army Ordnance funds for the tire testing program at Camp Bullis, Texas, or anywhere else in the continental limits of the U. S. The Senate Appropriations committee, however, subsequently deleted this prohibition when it reported out the bill on July 17, in effect voting to restore the tire testing funds.

That leaves the situation very much up in the air at the moment.

The government has been seeking an appropriation for the Camp Bullis tire testing program of $2,140,000 for the current fiscal year, with Army Ordnance contributing $600,000 of this sum and the balance, $1,540,000, coming out of the RFC budget.

RFC already has decided to slash its contribution to the program to $450,000. If no Army Ordnance funds are available, RFC may suspend the program, carry it on at a vastly reduced level, or contract out its tire testing work to private industry. One of the chief contentions of the Armed Services subcommittee which condemned the program in a May 28 report was that private industry, already engaged in testing its own tires, could do the government's work more cheaply than RFC has been doing it.

RFC, prior to the final Congressional verdict, had not decided on what to do about the program. However it had sent out inquiries to private companies to get their ideas on whether they would conduct a program. The Camp Bullis project, under RFC supervision, was conducted by Copolymer Corp. on a cost-plus-percentage basis.

[1] India Rubber World, July, 1953, p. 511.

Enamel-Coated Rims

The rims for trucks, trailers, and farm implements made by Goodyear Tire & Rubber Co., Akron, O., are being coated with a heat drying enamel instead of the conventional galvanizing in order better to equip them to withstand the corrosive effects of weather. Tests reportedly show greatly increased life for the enamel coated rims.

Known as Bond-A-Coat, the new material is applied after the rim has been cleaned and "bonderized," and is baked on to provide a tough surface. In addition to resistance to corrosion, the enameled rims are claimed to be resistant to marring and to stains from oil and grease.

All truck rims supplied to the U. S. Army by Goodyear are Bond-A-Coated; the company recently extended the process to include all demountable truck rims down to and including the 6.50 T size, as well as rims for farm implement and earthmoving vehicles.

Monsanto in Mexico

Monsanto Chemical Co., St. Louis, Mo., has announced the formal opening of a new plant of its wholly owned subsidiary, Monsanto Mexicana, S. A., for the production of polyvinyl chloride resin and compounds. Located in Lecheria, adjacent to Mexico City, the Mexican facilities began operation in February, 1951, with the manufacture of Lustrex styrene molding compound and added, in January, 1952, production units for Fibestos acetate molding compounds. The present PVC unit is said to be capable of accommodating present needs and planned expansion in the vinyl consuming industries in Mexico.

Price Reductions

Maleic anhydride and fumaric acid, manufactured by Monsanto, have been reduced in price by 5¢ a pound. In announcing these reductions, the company expressed the belief that added impetus would be thus given to the rapidly growing use of polyester laminates, for which the chemicals are important raw materials.

New Research Laboratory at Nitro

Monsanto plans to erect a four-story engineering research laboratory at its Nitro, W. Va., plant. The new structure, which will occupy more than 5,000 square feet of area, is expected to be completed by mid-1954. It will house various items of equipment for process development and research as well as offices and storage facilities.

Following closely the completion last year of additional research facilities at the same location, the new laboratory will initially be staffed with eight technologists and eventually with 15. Work will be done in the fields of rubber and agricultural chemicals and oil additives as well as synthetic detergents.

Personnel in New Assignments

Assistant branch managers have been assigned to two eastern sales offices of Monsanto's plastics division, Springfield, Mass.

Robert S. Garvie has been promoted to assistant branch manager of the division's New York, N. Y., office; while Robert R. Wilson has been advanced to the same position in the New England office at Springfield.

Garvie joined the company in 1947 as a sales representative for Monsanto plastics in the New York area.

Wilson, after 12 years in production and sales of plastics, became a salesman for Monsanto in 1948. Since then he has been attached to the division's offices at Detroit and Cincinnati.

Clark L. Richards has been promoted to sales manager for thermosetting molding materials of the plastics division; while Joshua S. Miller has been made assistant sales manager for the same products.

Richards, assistant sales manager for thermosetting molding materials since 1947, joined the division in 1938 and began his selling career the following year when he was transferred to Los Angeles as branch manager of the division's office there. Richards also held the position of branch manager in the division's St. Louis office from 1944 to 1947.

Miller joined the sales department of the plastics division in 1950, following a 14-year association with Durez Plastics & Chemicals, Inc. Since 1952, he has been assistant branch manager in the division's New York office.

Goodyear Aircraft Changes

O. W. Weyrick has been appointed manager of materials, and T. A. Matthews, acting manager of planning and control at Goodyear Aircraft Corp., Akron, O.

Weyrick now is responsible for all material ordering, receiving, and storing for all divisions at the company's Massillon Road and Wingfoot Lake plants.

Matthews is responsible for factory manufacturing planning, bills of materials, production control, finished parts stores and tool storage, except where it concerns wheel and brake, vinyl products, and rocket divisions. He is also responsible for traffic and all shipping except that pertaining to wheel and brake.

Manager of stores and materials since 1940, Weyrick has more than 30 years of Goodyear service. He joined Goodyear Tire & Rubber Co. in 1923 as a stenographer. Five years later he was transferred to the specifications department, Goodyear Zeppelin Corp., where he remained until 1935, when he was returned to Goodyear's aeronautical department in estimating and servicing operations. His transfer to Goodyear Aircraft followed four years later.

Matthews joined Aircraft on special assignment in January, 1953, following three years as assistant general manager of the Barberton, O., division of Rockwell Mfg. Co. He has also had considerable experience in production planning and methods and standards work.

Walter C. Ireland has joined the sales division of the Goodyear Aircraft as eastern district representative for the sub-contract projects department of the sales division. He will handle the solicitation and servicing of accounts with aircraft manufacturers and producers of aeronautical products in an area embracing New England, Pennsylvania, Maryland, and New York. His office is at the New York district headquarters of the parent company, 92 Madison Ave. Ireland spent several years with Republic Aviation Corp. and Wright Aeronautical Corp.

Green in New Post

Howard I. Green, who resigned as vice president and director of Fidelity Machine Co., Philadelphia, Pa., following the sale of the Green interests a few months ago, has been named president of Fidelity-America Financial Corp., private bankers, with offices in the Fidelity-Philadelphia Trust Bldg. This banking firm recently was organized by a small group of business, legal, and financial men to do commercial financing in the Greater Philadelphia industrial area. This company will concentrate its services in the rubber industry and will specialize in accounts receivable financing. The company will also handle financing for: government contracts, inventories, drop shipments, installment sales, machinery and equipment, mortgages, rediscounting, purchasing a business, and buying out partners.

Rubber-Fire Extinguisher Chemical

"Rockwood Wet," a surfactant produced by the Antara Chemicals Division, General Dyestuff Corp., expressly for the Rockwood Sprinkler Co., Worcester, Mass., was used successfully in extinguishing a seven-alarm crude rubber fire in which 4,000 tons of crude rubber and 2,000 tons of tannin extract were ablaze. The liquid material is a heat-stable wetting and penetrating agent with the viscosity of glycerine and is mixed with water in the ratio of 1:100 to obtain the proper consistency for spraying.

Reclaim Patents to Neville

The Neville Co., Pittsburgh, Pa., last month announced that it has acquired exclusive rights to the Charles H. Campbell patents covering rubber reclaiming oils and rubber reclaiming processes. Mr. Campbell has been granted many patents covering rubber reclaiming oils and other rubber compounding and process developments dating back to the Twenties.

During World War II the rubber reclaim industry was suddenly called upon to produce large quantities of reclaim from the difficult-to-process GR-S and mixed GR-S and natural scrap. Campbell's development work, and his patents covering reclaiming oils and processes issued then and since, were of considerable assistance to the industry in accomplishing this and the production of the large amount of such reclaim required since then.

Neville, at the same time, announced the appointment of Paul Long, associate of Mr. Campbell, to its technical sales force. Mr. Long will specialize in the sale of Neville's rubber reclaiming oils and to this extent will augment the service of Neville's sales agents and technical personnel.

NYBP Sales Staff Changes

The following appointments in the sales division of New York Belting & Packing Co., Passaic, N. J., were announced last month by Joseph A. Conlon, vice president.

Named to regional sales manager posts were Wenzel A. Lindfors and Carl G. Link. The latter will handle the Great Lakes region including the heavily industrialized Chicago, Pittsburgh, and Detroit areas; while Mr. Lindfors will supervise sales in the rest of the country.

Wilbur E. Combs was appointed merchandise manager, and Harry H. Raber, sales operating manager. Both will have their headquarters at the company's Passaic offices.

New York Belting & Packing, now in its one hundred and eighth year, is considered the oldest supplier of industrial rubber products in the United States.

Plant Addition Completed

Velsicol Corp., division of Avery Corp., 330 E. Grand Ave., Chicago 11, Ill., has completed a $2,000,000 addition to its Memphis, Tenn., plant in which chlorine, liquid caustic, hydrogen gas, and bleach are produced. Constructed to meet the sharply increased demand for the company's chlorine products, the new facilities produce 88,000 pounds of liquid chlorine and 110,000 pounds of caustic per day.

Francis L. Shackelford, Jr.

Shackelford in New Post

Two changes in sales personnel of the organic chemicals department were announced July 14 by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Francis L. Shackelford, Jr., for the last three years sales manager for "Freon" fluorinated hydrocarbon propellents of the "Kinetic" chemicals division, has been named to the newly created post of assistant sales development manager for the rubber chemicals division. His duties in the "Kinetic" division have been assumed by Thomas D. Johnson, Jr., since June, 1952, manager of the auxiliary section of the dyes and chemicals division.

Shackelford started in the company's organic chemicals department in September, 1939, as an analytical chemist and late the following year was named a junior supervisor in the dyestuffs intermediates section. Early in World War II he served as production supervisor at explosives department plants and in January, 1943, was assigned to the company's neoprene plant at Louisville, Ky., as a shift supervisor. He returned to the explosives department several months later. Then from October, 1945, to May, 1950, he was production supervisor and chemical engineer in the dyestuffs intermediates section of the Chambers Works, Carney's Point, N. J.; next he joined the sales staff of Kinetic Chemicals, Inc. When the latter became a division of du Pont's organic chemicals department in July, 1950, he was named sales manager of the propellents section.

Mr. Johnson started in the organic chemicals department as a chemist and shortly afterward was transferred to the research and plant development section of the explosives department's Burnside Laboratory. In September, 1945, he returned to the organic chemicals department as a technical sales trainee and served as a technical salesman for dyes and fine chemicals in the Portland, Ore., district until December, 1949, when he was named assistant to the technical manager of the fine chemicals department.

Stanley F. Choate has joined Tumpeer Chemical Co., 333 N. Michigan Ave., Chicago 1, Ill., as a sales representative. Mr. Choate, most recently with O'Connor & Choate, Inc., has been in the rubber and chemicals industry for 11 years, except for his Navy service during World War II.

Eliminates Week-End Truck Shipments

In an attempt to promote safety on the nation's highways, The Timken Roller Bearing Co., Canton, O., has curtailed all inbound and outbound truck traffic between its various plants, to customers, and from suppliers between midnight, Friday, and midnight, Sunday. Only in extreme emergencies, when customers' production schedules would be seriously affected, are exceptions made to the rule. This policy has been in operation since May 30, and it is reported that no production schedules have been impaired because of it.

Moves to New Plant

Chemical Rubber Products, Inc., has transferred activities from Glendale, L. I., to Beacon, N. Y. The company's new quarters consist of a one-story fireproof building with 22,000 square feet of floor space, more than three times the former area; a railroad siding to load or unload three freight cars simultaneously; and four truck loading platforms.

The firm also purchased additional new equipment, including an 80-inch rubber spreader, to produce more than four times the volume and a greater variety of rubber coated fabrics than produced at Glendale. Also installed is a modern laboratory for testing and research, headed by Edward McCarthy.

Chemical Rubber Products, which now has 48 employes, has developed cable wrappings, diaphragms (regular and fuel pump), protective clothing, and special coated fabrics for tubing. It also is busy on government sub-contracts for rubber coated fabrics for inflatable sleeping pads and life rafts, impermeable clothing, and anti-exposure suits.

More Rubber Roads

A section of rubber pavement, consisting of 2½-5% natural rubber powder added to the weight of asphalt used, has been laid on First Ave. between 24th and 25th Sts. in New York, N. Y. A similar section had been laid on an express highway in the city three years ago, but the exclusion of trucks on the highway prohibited the evaluation of the effect of heavy vehicles on the pavement. The present stretch, which has been laid over the previous concrete block road, is expected to provide the heavy vehicle information in addition to decreasing road maintenance.

New Refinancing Program

A refinancing program which will provide an additional $1,000,000 in working capital was announced July 6 by Seiberling Rubber Co., Akron, O.

Negotiations have been completed with the Penn Mutual Life Insurance Co. of Philadelphia for a loan of $2,000,000 at 4½% interest, half of which will retire the company's present note amounting to $1,000,000, with the balance to be used for working capital.

Announcement of this new financial arrangement was made by R. J. Thomas, vice president and treasurer of Seiberling, who said the loan would be payable in installments of $200,000 on July 1 of each year for the next 10 years.

Goodrich Executives Shifted

Wallace F. Bowman and J. G. Thompson have been named treasurers of the newly formed B. F. Goodrich Tire & Equipment Division and of the B. F. Goodrich Industrial Products Division, respectively.

Bowman, who had been assistant controller of The B. F. Goodrich Co., Akron, O., has been with BFG since 1929. He was manager of accounting-manufacturing before becoming assistant controller in November, 1952.

Thompson joined the company in 1929. He became manager of the accounts payable department in 1939, in 1943 was assigned to contract termination and renegotiation of government contracts, served on special assignments in the office of the controller, and most recently was manager of accounting-manufacturing.

Harold Gray has been appointed technical director of the Tire & Equipment Division, while Robert H. Wattleworth becomes director, Akron services.

Gray has been with BFG since 1919 and was one of the co-discoverers of non-accelerating age resistors for rubber in 1924. In addition to these discoveries, he has made substantial contributions to the development of rubber adhesives, particularly in the field of bonding rubber to metal. Gray became technical superintendent of the tire manufacturing division in 1941.

Wattleworth started with Goodrich in 1926 and has spent all his service in the processing division. He was named general superintendent in 1946.

Glass Fiber Insulation

An improved line of Class H glass fiber tubing and sleeving for use as electrical insulation is now available as a result of the recent introduction of SE-100 silicone rubber coating compound by General Electric Co., Pittsfield, Mass. Called BH "1151," the new insulation is produced in 27 sizes by Bentley, Harris Mfg. Co., Conshohocken, Pa., from braided glass fiber coated with the silicone rubber. The new insulation is said to have unusual dielectric strength and to keep its flexibility throughout the life of the equipment to which it is applied.

Underwriters Approve Silicone Insulation

Silicone rubber insulated wire for use in lighting fixtures which operate at temperatures up to 200° C., and for radio and television hookup wire at temperatures up to 150° C., has for the first time been approved by the Underwriters' Laboratories. Made by Essex Wire Corp., Fort Wayne, Ind., the new Sil-X wire consists of a stranded conductor electrically insulated and temperature protected by a flexible extruded coating of SE-460 silicone rubber, product of General Electric Co., Pittsfield, Mass.

Seven sizes of the wire have been approved, and, on application of specific users, 19 other sizes for devices and appliances operating at temperatures up to 200° C. are expected to be approved. All sizes are coated with SE-460 in thicknesses ranging from 15-77 mils, and the rubber is covered with a special lacquered glass braid which has excellent abrasion resistance. In case of severe fire, the silicone reportedly burns to a non-conducting silica ash to permit the continued emergency operation of the wire.

Join Anaconda Wire & Cable

Robert T. Shiels, Jr., has been named district manager in the Dallas territory for Anaconda Wire & Cable Co., New York, N. Y.

Jim Lord and Ray Galenbeck have joined Anaconda W&C as salesmen. Mr. Lord will serve in Chicago, and Mr. Galenbeck in Anaconda's Seattle office.

Mr. Shiels has a substantial background in the electrical field. His previous associations include: General Electric, Schenectady, N. Y., from 1940 to 1942; U. S. Army Signal Corps as major from 1942 to 1946; and G. E. Supply Co. in both Dallas and Fort Worth from 1946 to 1953.

Mr. Galenbeck was with Weity Electric Construction Co. of Des Moines, Iowa, from 1937 to 1939; Electric Supply Co., of the same city, from 1939 to 1942; Bonne Electric Construction Co., Amarillo, Tex., from 1942 to 1944; and from 1944 until joining Anaconda he was with G. E. Supply in Des Moines.

Mr. Lord's previous affiliations include sales work in Standard Oil of Indiana from 1932 to 1949; with Pacific Mutual Life from 1949 to 1951; and since 1951 with Gray Audograph Corp.

Kleinert Advances Mergentime

Charles B. Mergentime, director and treasurer of I. B. Kleinert Rubber Co., 485 Fifth Ave., New York 17, N. Y., has been elected a vice president of the company. Besides his responsibilities as treasurer, Mr. Mergentime is the director in charge of merchandising for the shower curtain and girdle departments at Kleinert's.

Currently the company is planning an expanded promotion program for the Featherlap rubber girdle introduced last spring, in addition to a national advertising campaign for its exclusive Aquatized Chromidescent (made of Chromspun) shower curtains and its Fleecenap shower curtains, made of natural rubber. For the first time it is possible to screen print these rubber shower curtains, which will appear in a well-styled line in prints.

New Koppers Sales Office

Establishment of a new sales office and appointment of a manager have been announced by C. H. Pottenger, sales manager of the chemical division of Koppers Co., Inc., Pittsburgh, Pa.

Leo J. Diamond is manager of the new southern district sales office in Room 1029 of the Healey Bldg., Atlanta 3, Ga. He was formerly a sales representative for the division working out of the New England district sales office.

Recognizing the growth of the chemical industry in the South with its increased sales potential, Koppers has established this new office to give on-the-spot sales coverage and service to its southern customers. Territories covered include Texas, Oklahoma, Arkansas, Mississippi, North and South Carolina, Tennessee, Florida, Alabama, Georgia, and Louisiana.

Brown Chemicals, 15 Moore St., New York 4, N. Y., which went out of existence as such on July 15, is now operating as the chemicals division of Swan-Finch Co., 205 E. 42nd St., New York 17, N. Y.

Step-up for Lamela and Finkel

William F. Lamela has been assigned new duties in factory production at The Okonite Co., Passaic, N. J., in order to assist Edward D. Youmans, vice president in charge of manufacturing and research, with important activities in interplant work production scheduling, inventory turnover, and related subjects.

Charles A. Finkel has assumed Mr. Lamela's former duties as technical manager of the research and chemical laboratories.

Mr. Lamela has worked at Okonite for 35 years. He has served 12 years on the Industry Advisory Committee on Navy Shipboard Cable. He is also a member of the American Chemical Society and the New York Rubber Group, where he was on the executive committee from 1950 to 1953.

Mr. Finkel has been employed by Okonite for 23 years. He is a registered professional engineer and a member of the Passaic County Engineering Society; Insulated Power Cable Engineers Association; National Electrical Manufacturers Association, of which he is a technical advisor; American Society for Testing Materials; National Fire Protection Association; International Association of Electrical Inspectors; and the American Ordnance Association.

Passenger Conveyor Belts

Tests employing men, women, and children of all ages, including the physically handicapped, have been conducted on a nine-foot wide, 60-foot long passenger conveyor belt, synchronized with 14-place passenger cars, by Goodyear Tire & Rubber Co., Akron, O., and Stephens-Adamson Mfg. Co., Aurora, Ill. The tests, which took place at the latter's plant, were made in conjunction with the system proposed by the firms for eliminating the subway shuttle between Grand Central and Times Square in New York, N. Y.

Results reportedly indicate that the people experienced no difficulty in boarding a sidewalk moving at 1½ miles per hour; and complete safety and comfort were possible in accelerating and decelerating up to 15 miles per hour. In addition, the ability of the system to carry 16,000 passengers per hour and to eliminate batching of passengers at stops was said to have been proved.

Supplier-Designer-Converter Agreement

Monsanto Chemical Co., Springfield, Mass.; John and Earline Brice, New York, N. Y.; and Jason Corp., Hoboken, N. J., have entered into an agreement to coordinate their various capacities as raw material supplier for vinyls, designers, and converters of vinyl film and sheeting, respectively, in order to offer to fabricators of vinyl finished goods an integrated program of manufacture, design, and conversion. The result of the venture is expected to contribute significantly to a general upgrading in the quality of finished vinyls.

The Brices are already designing new fall lines for a wide variety of fashion and home furnishing end-uses.

The Jason Corp. is reported to be currently expanding production facilities to handle the complete converting operation which will include texturizing, printing, and laminating.

Patent Infringement Charged

United States Rubber Co., Rockefeller Center, New York 20, N. Y., has filed suit against Armstrong Rubber Mfg. Co., Des Moines, Iowa, subsidiary of Armstrong Rubber Co., charging infringement of patents covering the U. S. Royal Master tire. The protruding rib structure for the protection of the white sidewall and the appearance or design of the narrow white sidewall tire, as enhanced by this rib, are the two basic points involved in the suit. It is reported that U. S. Rubber has marketed these tires since 1950 and that the company was granted patents on them in 1951.

Personnel Promoted

Warren A. Tipton has been appointed general sales manager of the mechanical goods division, succeeding Walter F. Spoerl, retired. Mr. Tipton joined U. S. Rubber as a salesman in its Houston, Tex., branch in 1935. In 1937 he was named product manager for industrial packings and expansion joints; in 1942, district sales manager for the mechanical goods division's New York branch; and in 1949, manager of all branch sales, with headquarters in the division's executive offices in Rockefeller Center. He became sales manager of the mechanical goods division in 1952.

Mr. Spoerl started his rubber career in 1908 as a clerk in the company's Chicago sales office. After rising through various sales and administrative posts, he moved to the company's New York offices in 1934 as assistant manager of branch sales for the mechanical goods division. He was named merchandise manager in 1944 and general sales manager for the division in 1946.

David E. Durst has been appointed manager of industrial relations of the international division of the company. He was formerly tire plant supervisor in the manufacturing and development department.

H. J. Helmer, formerly assistant industrial relations manager, has been transferred to the manufacturing and development department as production assistant.

Colombian Plant to Make Tires and Tubes

Cia. Croydon del Pacifico, S.A., a Colombian company half owned by U. S. Rubber, announced July 22 that it has made arrangements to expand its plant at Cali and will begin making U. S. Royal tires and tubes about mid-1954. Colombia will become the fifth Latin American country to manufacture these products.

Announcement of the expansion was made jointly by L. C. Boos, vice president and general manager of U. S. Rubber's International Division, and by Ernest A. Leupin, resident general manager of Croydon.

When the new plant facilities are completed, tires and tubes will be made for both passenger cars and commercial vehicles and for bicycles. The new addition will be adjacent to the present plant where footwear, raincoats, molded goods, and light mechanical goods are turned out.

Present employment totals about 600, and this will probably increase to 800 when tires and tubes are in full production, Mr. Boos declared. Square footage of the Colombian plant will be increased about 30%.

Tire Outlet

An agreement has been negotiated between U. S. Rubber and Champlin Refining Co., Enid, Okla., which provides for the sale of U. S. Royal passenger, heavy service, farm and industrial tires through Champlin outlets. The refining company, said to have the largest independently owned refinery in the world, supplies 700 distributors and more than 1,000 service stations in a 12-state area, extending from Oklahoma to the Canadian border, with oil products.

Fellowships Renewed

U. S. Rubber has announced renewal of its graduate management training fellowship at Radcliffe College and its physics fellowship at the University of Virginia. The former has been extended for a period of five years and carries with it a stipend of $700 a year; the latter fellowship provides $1,500 in assistance to the recipient for one year.

Weed Killer

A new agriculture chemical that reportedly kills weeds as they begin to sprout and before they emerge from the ground has been developed by Naugatuck Chemical Division. Called Alanap, the material is known chemically as N-1 naphthyl phthalamic acid. Effective dosages range from 4-8 pounds per acre and are said to give good weed control for a period of from 3-8 weeks. Alanap is claimed to have low toxicity to warm blooded animals and can be used safely on many truck garden crops. It may be applied by using standard spray equipment.

Vinyl Squeeze Toys

Plastic squeeze toys, which reportedly will not fade or be damaged by sterilization in boiling water, are being made from Marvinol, product of Naugatuck Chemical, by Molded Latex Products, Inc., Paterson, N. J. Advantages claimed for the vinyl over other plastics include warm and attractive feel and ease of molding, coloring, and cleaning.

Cactus Cushions

Mexican cactus fiber is being made into shock-absorbent cushions by spraying it with Lotol, a specially compounded natural rubber latex produced by Naugatuck Chemical. The fiber strands, which have been curled by steaming, are formed into mats, sprayed with latex, and heat cured to produce a resilient product reported to be capable of absorbing a 100-pound weight of one square-foot area for a period of one week with only a faint impression remaining. The cushioning, called Tulapad, is manufactured by Queen City Tulatex Corp., Burlington, Vt., and is currently being used on lawn furniture.

© Fabian Bachrach

Alex Schulman

Orlon-Rayon Fabric

A new fabric blend consisting of 60% Orlon and 40% spun viscose rayon has been announced by U. S. Rubber. Known as Royal-O, the material will be made at the facilities of the company's textile division in Winnsboro mills, S. C. Such garments as women's and children's dresses and suits, men's sports shirts, and sportswear for the entire family can be produced from the fabrics which are made in plaid, stripe, and check patterns and in plain and puckered textures. Advantages claimed for garments made of the material include light weight, unusual comfort, complete washability, crease retention, and wrinkle resistance.

Embossed Vinyl Raincoats

A new type of satiny vinyl plastic raincoat for women, girls, and children is being manufactured by U. S. Rubber. Called Zephyrettes, the products are lightweight, strong, and waterproof and are available in three sizes in blue, green, or white. Fashion features of the coat, which can be carried in a vinyl pouch, include a detachable hood and a belt.

Schulman Silver Jubilee

A. Schulman, Inc., Akron, O., is celebrating its twenty-fifth anniversary this month. Established by Alex Schulman in 1928, the company has grown from a small warehouse with two employes to a worldwide organization with offices and warehouses in London, England, and Hanover, Germany, and agents in Japan, Spain, Ireland, India, and several South American countries. In the United States, the firm has warehouses and offices in Akron, East St. Louis, Ill., and Elizabeth, N. J., and sales offices in New York, N. Y., and Boston, Mass.

Originally set up to serve reclaim plants, the company is now not only a major supplier of scrap rubber for reclaimers, but also an importer and dealer in crude rubber, and a processor and dealer in hard rubber dust, plastics scrap, and scrap foam rubber. During the past quarter-century Schulman has become a leader in its industry, not only in the volume of scrap handled, but also in pioneering developments in cooperation with reclaimers. An organization with more than 300 employes at present, the firm's two main plants and storage yards are located on more than 40 acres of land with more than 100,000 square feet of floor space.

At the head of the organization is Alex Schulman, a veteran of 37 years in the scrap rubber and allied fields. J. K. McElligott is vice president and manager of the Akron plant. Milton Kushkin is vice president and manager of the East St. Louis branch and warehouse. Heading the New York office, which recently moved to 53 E. 34th St., and the export-import division as manager is Vice President Paul Baudry; while Seymour Martin manages the Boston office.

L. W. Bottomley directs operations in London, England, as general manager; while H. Bolte is director of the office in Hanover.

New Plastic Pelletizing Plant

Alpha Chemical & Plastics Corp., compounder and processor of plastic materials, recently put into operation new pelletizing facilities for the processing of plastics. Present operations are confined to coloring, screening, and pelletizing of polyethylene. Activities, however, are soon expected to extend to styrene and allied molding and extrusion compounds.

The milling, mixing, and grinding equipment at the plant, with offices at 1-23 Jabez St., Newark 5, N. J., is presently being used exclusively for the processing of vinyl scrap and virgin. A great variety of such compounds is available for garden hose, welting, belting, tubing, and similar extrusion as well as molding purposes.

The executives of Alpha, J. Hirschberger and Eric F. Ross, are also heading Rotex Rubber Co., Inc., Newark, buyer, seller, and grader of all types of plastic and rubber scrap.

Dobberstein Honored

Arthur W. Dobberstein, vice president in charge of manufacturing, International Latex Corp., Dover, Del., recently was given a surprise party by nearly 300 of his business associates to mark his twentieth anniversary with the company, which he had joined on June 1, 1933. Among the speakers were A. N. Spanel, founder of the company and chairman of the board, and W. O. Heinze, company president.

A trip to Europe for Mr. and Mrs. Dobberstein, to be taken probably this fall, is the company's gift to its vice president. He also received a solid silver service from Mr. and Mrs. Spanel and Mr. and Mrs. Heinze.

Fatty Alcohol Plant

Unsaturated high molecular weight alcohols as well as saturated alcohols, glycerine, and caustic soda will be produced at a new chemical plant of the Archer-Daniels-Midland Co., Minneapolis, Minn., to be located at Ashtabula, O. Ground for the new plant was broken in June, and production of the alcohols is expected in June, 1954.

The process to be employed is reported to involve sodium reduction of linseed, soybean, and marine oils. Use of the unsaturated alcohols as vinyl plasticizers, peptizers for synthetic rubber, and antioxidants is anticipated.

Federal Chemicals Formed

Announcement has been made of the formation of Federal Chemicals Corp., 210 Wythe Ave., Brooklyn, N. Y. The firm will produce and supply vinyl plastisols and organisols to the toy and novelty fields and is expected to service technical and industrial firms which use their material. Free technical consulting service for fabricating companies is featured by the firm.

The company's facilities consist of the main plant and technical laboratories in Brooklyn and the factory of an affiliated company, Adex Mfg. Co., in Baltimore, Md.

Officers of the new corporation are Philip M. Liner, president; Arthur Mayer, vice president; and Mortimer E. Stern, secretary and treasurer. Samuel W. Strickman will be general manager of the organization.

Adding to Facilities

Bjorksten Research Laboratories, Inc., has moved its Chicago office and laboratories from 13791 S. Avenue "O" to 1525 E. 53rd St., Chicago 15, Ill. Edwin L. Gustus, vice president, will continue to head this branch.

Bjorksten Laboratories maintains its headquarters in Madison, Wis., where a new three-story laboratory and office building is currently in construction.

Robert L. Goller has joined the Madison laboratories. He was formerly with the du Pont chemical division and Pittsburgh Plate Glass Co., where he was engaged in formulation and evaluation of plastisol materials for coated textiles, and control work.

Chemicals Show to Move

Announcement has been made that the Exposition of Chemical Industries, held in New York almost continuously since 1915, will move to Commercial Museum and Convention Hall in Philadelphia, Pa., for its twenty-fourth biennial showing November 30 to December 5, 1953. The substantial increase in exhibit area is expected to make it the largest display of its kind ever held. Former exhibitors are reported planning expanded layouts, and nearly 100 new exhibitors have already engaged space.

New Chairman for Hercules

Charles A. Higgins has resigned as chairman of the board and member of the finance committee of Hercules Powder Co., Wilmington, Del. Anson B. Nixon, former vice president of the company, and Albert E. Forster, president of Hercules, were elected to succeed Mr. Higgins as chairman of the board and member of the finance committee, respectively.

The resignation is a result of the company's retirement policy. Mr. Higgins, however, will remain a director.

Testimonial for Spoerl

Executives of the mechanical rubber goods manufacturing industry attended a testimonial dinner for W. F. Spoerl, general sales manager for mechanical rubber goods, United States Rubber Co., Rockefeller Center, New York 20, N. Y., at the Hotel Warwick, New York, June 25. The occasion for the dinner was the retirement of Mr. Spoerl at the age of 60 from active service with U. S. Rubber after 45 years. The industry presented to Mr. Spoerl a 25-hp. outboard motor together with a number of appliances for his boat.

Armed Services Textile & Apparel Procurement Agency, 111 E. 16th St., New York 3, N. Y., recently reported the awarding of the following contracts for: insulated rubber combat boots, to Bristol Mfg. Corp., Bristol, R. I., for 200,000 pair, value, $1,948,000. Tyer Rubber Co., Andover, Mass., 47,270 pair, $460,409.80, and to Goodyear Rubber Co., Middletown, Conn., 40,160 pair, $405,375.04; men's high, five-buckle fastening rubber overshoes, Tyer, 22,644 pair, $65,667.60.

Vented Vinylite Film

A new process for venting vinyl film has been announced by Renick Boggs & Co., Chicago, Ill. The resulting material, called Vent-o-lized Vinylite, contains tiny holes of near microscopic size which permit the passage of air while retarding water.

The new process is said to be capable of producing the film from transparent, translucent, and opaque material in almost any thickness desired, and with many types of texture. The number and the size of the pores, approximately 100,000 per raincoat, can also be increased or decreased. Resistance to tearing is reportedly not impaired by the holes.

Wide usage of the Vent-o-lized Vinylite as packaging materials, garments, and durable upholstery is expected. The first products made are raincoats, now available for men and women in clear or smoky grey colors.

New-Type Valley Die Size

Seiberling Rubber Co., Akron, O., has developed new-type valley die sizes of rubber stock, which are said to eliminate extra steps and added cost in top-capping truck tires and retreading earthmover tires. Available in cold rubber stock for truck tires and in a natural rubber compound for earthmovers, the new die sizes were developed for use where tire shoulders have "dropped" to such an extent that it is impossible to maintain correct buffing contour.

Extra shoulder thickness of the valley die sizes reportedly makes up for tire shoulder drop-off and makes it unnecessary to build up with baby camelback or a similar material. The die sizes for earthmover tires are available in six full tread widths. The two larger sizes, 18.00 and 21.00, are available in full widths or in three-piece construction.

Chemical Research Facilities

American Machine & Foundry Co., New York, N. Y., has purchased a one-story, 12,000 square-foot building in Springdale, Conn., for housing a chemical research and development laboratory. The facilities will perform work on new products and processes in the fields of plastics, electrical insulation, etc. A group of 30 research scientists and technicians under the direction of G. P. Hungerford, research manager, is expected to move into the building by October 1.

FMSI Holds Elections

Friction Materials Standards Institute, Inc., 370 Lexington Ave., New York 17, N. Y., at its recent annual meeting elected the following officers to serve for one year beginning July 1, 1953: president, Fredk. C. Weyburne, Marshall-Eclipse Division, Bendix Aviation Corp.; vice president, Geo. E. Ritter, Molded Materials Division, Carlisle Corp.; treasurer, Vincent A. Spina, Scandinavia Belting Co.; and secretary, Miss Harriet G. Duschek.

Other members of the board of directors, serving with these officers, are: Frank W. Shelton, Grizzly Mfg. Co.; Franklin A. Miller, Raybestos-Manhattan, Inc.; Howard N. Wilhelm, RiteSet Mfg. Co.; Leo S. Sullivan, Russell Mfg. Co.; and Wm. J. Nanfeldt, World Bestos Corp.

New Titanic Dioxide Plant

Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J., has announced that it will build a new $14,000,000 plant for the production of its Unitane titanium dioxide. To be erected on the outskirts of Savannah, Ga., the plant will occupy a 1,600-acre tract along the Savannah River. Construction will begin the last quarter of this year, and the new plant is expected to be completed early in 1955. This will be Calco's third facility for producing titanium dioxide; the other plants are at Piney River, Va., and Gloucester City, N. J.

Firestone Defense Contract

An Army Ordnance contract award of $8,000,000 was made on July 21 to New Bedford Defense Products, New Bedford, Mass., a subsidiary of Firestone Tire & Rubber Co., for the production of 106-millimeter shells, starting next February. This was the Army's second major award this year to New Bedford; a previous contract was signed for the production of 155-millimeter shells.

Rubber Film—Vulca Film

Vulcafilm, a rubber film said to combine the properties of plastics and synthetic rubber, has been announced by The B. F. Goodrich Co., Akron, O. The material can be compounded to be resistant to oil, gasoline, acids, heat, cold, abrasion, and sunlight and can be combined with many types of fabric reinforcement.

The assembly of shapes or vessels of any size from the film can be accomplished without cementing or taping the seams since electronic welding reportedly provides a seal stronger than the material itself. The film has been successfully used in making oil tank diaphragms which cover the tank to prevent loss through evaporation. The covering can be designed to rise and fall with the liquid level, or it may be stretched over the top without support. Other uses of the material have been as tank lining to protect walls from the corrosive effects of sulfuric fumes present in sour crude oils, and as inflatable pillows to prevent the shifting of freight cargoes while in transport.

Hycar Valve for Aircraft Refueling

Shut-off valves, equipped with Hycar rubber diaphragms, are being used by the Air Force to stop automatically the pressurized flow of fuel into the wing tanks before fuel capacity is reached and thus prevent the overflow or rupture of the fuel tank. Hycar rubber, product of Goodrich Chemical, reportedly resists the deteriorating effects of modern aircraft fuels and the extreme pressures and remains resilient and flexible through a temperature range required for this operation of —65 to 167° F.

The rubber is compounded to meet military specification MIL-R-6855, Class I, by the diaphragm molder, Vulcan Rubber Products, Inc., Brooklyn, N. Y. The valves are made by Aero Supply Mfg. Co., Inc., Corry, Pa.

CANADA

Rubber Use Down; Stocks Up

Consumption of rubber in Canada—natural, synthetic, and reclaim—was lower in May than in April; while month-end stocks advanced, the Dominion Bureau of Statistics reported. At the same time, domestic production of synthetic and reclaimed rubber rose.

Combined consumption during May totaled 7,506 tons, against 7,766 a month earlier, with natural rubber at 3,101 tons (3,090 a month ago), synthetic at 3,180 tons (3,400), and reclaim at 1,225 (1,276). Stocks on May 31 amounted to 10,451 tons, against 8,680 on April 30, and comprised 4,270 tons of natural (3,504 on April 30), 4,589 tons of synthetic (against 3,537), and 1,592 tons of reclaim (against 1,639).

Domestic output of synthetic rubber in May reached 7,597 tons, contrasted with 5,894 in April; while May production output of reclaim totaled 389 tons, against 381.

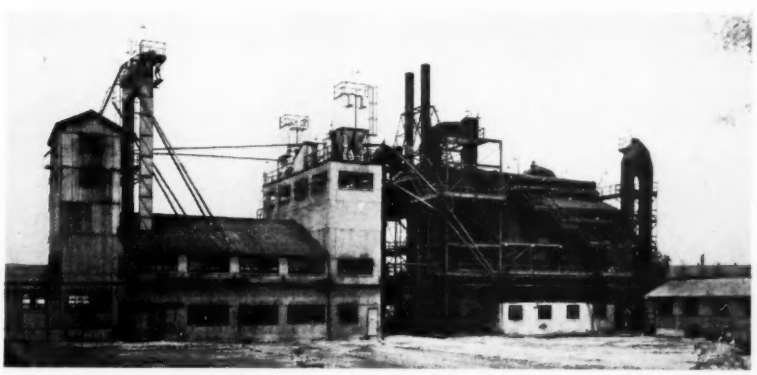
Cabot Opens Furnace Black Plant

Cabot Carbon of Canada, Ltd., subsidiary of Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass., has announced the opening and operation of the first oil furnace carbon black plant in the Dominion. The official opening ceremonies took place on June 26, with the Hon. Douglas C. Abbott, Canadian Minister of Finance, as guest of honor. Thomas D. Cabot, executive vice president of the parent company, introduced Mr. Abbott to an audience of more than 500 prominent Canadian industrialists and financiers and various government officials. Following an address by Mr. Abbott, the group toured the new facilities and enjoyed a special luncheon held in the plant warehouse.

The new plant is in Sarnia, Ont., in the heart of the thriving Canadian petrochemical industry. The site occupies an area of about 15 acres near several leading oil refineries and chemical manufacturing firms. Construction of the plant, which was begun in the early Spring of 1952, represents a capital investment of $3,000,000.

Annual production of oil furnace carbon blacks expected from the facilities amounts to 25,000,000 pounds, or approximately one-third of the present Canadian demand. The price of the material will be competitive with blacks from the United States even though the cost of manufacture in Canada will be somewhat greater at present. All the qualities of carbon black used in the country will not be made at the facilities, but it is expected that those qualities which are produced will be increasingly preferred by Canadian consumers.

The new plant uses liquid hydrocarbons as the raw materials. The production method involves the controlled combustion of a preheated oil charge in special reactors, the combustion air supplied under blower pressure. Two complete, parallel production units including reactors, cooling apparatus, and collection equipment, are present. In addition, the plant is equipped with a complete smoke elimination system, utilizing bag filters, made of synthetic fibers resistant to high temperatures, capable of preventing the escape of black or smoke to the atmosphere.



Sarnia Plant of Cabot Carbon of Canada

To Start Footwear Firm

A new boot and shoe factory, capitalized at $1,350,000 (Canadian) and capable of producing 1,000 pairs of shoes daily, is to be established at Harbour Grace, St. John's, Newfoundland. Raw materials are to be supplied by Newfoundland Tannery, Ltd., and a newly formed rubber company.

The new enterprise, to receive aid within the government's economic assistance program, will be directed by a German industrialist, assisted by his son and a number of skilled European technicians. The factory is expected to be ready some time in 1954, when it will employ about 350 persons.

Seiberling Bond Redemption

Seiberling Rubber Co. of Canada, Ltd., Toronto, Ont., is calling for redemption of existing first-mortgage bonds, as of August 17. These outstanding include $95,000 3¼% bonds due 1954-1956, inclusive; $415,000 4% bonds due 1966; and $125,000 5% first-mortgage bonds due 1960.

It is understood that Bankers Bond Corp. will shortly be offering a new first-mortgage bond issue aggregating $1,250,000, of which $250,000 will be 4½% five-year serial bonds maturing $50,000 a year 1954-1958, inclusive, and $1,000,000 will be 5¼% first-mortgage sinking fund bonds maturing 1973.

Net cash proceeds of $550,000 to be received by the company after redeeming the existing first-mortgage bonds will be used to pay for additions to plant and to increase working capital.

Earnings during the past three years, after depreciation, have amounted to 6.73 times maximum bond interest requirements.

NEWS ABOUT PEOPLE

Burton Smart

Burton Smart has been appointed southern district sales manager for United Carbon Co., Inc., and will be in charge of the newly opened sales office in the Sterick Bldg., Memphis, Tenn. He has been with United Carbon for the past six years as sales and technical sales representative both in the New York and Charleston offices. Prior to military service he had been employed by the S. D. Warren Paper Co., Westbrook, Me. Mr. Smart is a member of the American Chemical Society and its Division of Rubber Chemistry and also of the Joint SAE-ASTM Committee on Automotive Rubber.

J. A. Kleinhans has been appointed factory manager of the Mogadore, O., plant of the chemical division of The General Tire & Rubber Co., Akron, O. Kleinhans, a veteran of 17 years in chemical production and management activities, succeeds **Pete Knapp, Jr.**, named industrial relations manager for the plant which General will soon build at Ashtabula, O. Kleinhans' last position was manager of inorganic production for J. T. Baker Chemical Co., Phillipsburg, N. J., where he had been employed since 1936. He is a member of the American Chemical Society and the Army Ordnance Association.

J. A. Kleinhans

Raymond C. Firestone, vice president of The Firestone Tire & Rubber Co., Akron, O., on July 10 completed 20 years with the company, founded by his late father, Harvey S. Firestone, Sr.

George A. Wiedemer, with Seiberling Rubber Co., Akron, O., more than 31 years, has retired as manager of truck tire sales. His successor is **C. Sterling Parker,** truck tire sales representative. Wiedemer joined Seiberling in February, 1922, as the first office manager in the Kansas City, Kan., district office. Previously he had been with the Goodyear Tire & Rubber Co. During his long association with Seiberling, he served in several other capacities including that of Chicago district manager, manager of commercial tire sales, service department manager, manager of accessories and repair materials, and manager of truck tire sales, a position he held since 1945.

Parker joined Seiberling's merchandise distribution department in 1922 and also worked in the service department during his early years with the company. After leaving Seiberling for several years, he returned in 1943 as supervisor in mileage sales and in 1945 was named department manager. Later he became territorial representative and special representative of the truck tire sales department.

Winston Bradshaw has been transferred to the fine chemicals sales group of Carbide & Carbon Chemicals Co., a division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. He will assist with the market development of certain nitrogen, chlorine, and sulfur compounds as well as intermediates for the pharmaceutical and rubber chemical industries. For the past six years Mr. Bradshaw was a technical representative in the New York district sales office.

Fred W. Fraley retired July 1 as a vice president of Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, O. He had resigned recently as a director of the company. Mr. Fraley's 25-year career with Diamond began in 1928 as manager of the southwest sales office in Houston, Tex. In 1943 he became vice president—sales; he was a director since 1947. Mr. Fraley recently served with the National Production Authority under the "loan" plan whereby industry executives are recruited for temporary periods. At the time he concluded his nine months of service in December, 1952, Mr. Fraley was Assistant Administrator of NPA in charge of the Chemical, Rubber & Forest Products Bureau. During World War II he was a member of the WPB and Munitions Board industry advisory committees.

Brooks M. Dyer has been named assistant director of sales for Columbia-Southern Chemical Corp., Pittsburgh, Pa. Associated since 1943 with Columbia-Southern, a wholly owned subsidiary of Pittsburgh Plate Glass Co., Mr. Dyer previously had served as district sales manager at St. Louis and as assistant district sales manager at Philadelphia.

Brooks M. Dyer

William Carpenter, sales representative for Columbia-Southern at St. Louis, has been appointed acting district sales manager there.

K. K. Boyd was recently elected to the newly created post of vice president in charge of sales and purchases for Emery Industries, Inc., Cincinnati, O. This new position is the direct result of expanded activities which have led to broader problems of marketing the company's output. Mr. Boyd has been with Emery for the past 18 years. Starting as a marketing specialist, he assumed charge of all purchases, including the buying of the fats which are the company's principal raw materials. Subsequently he became director of purchases and sales and was elected first a director and later secretary of the company. Mr. Boyd came to Cincinnati in 1936 after a teaching career in Iowa schools. Currently he is active on the steering committee of the Fatty Acid Division of the Association of American Soap & Glycerine Producers.

K. K. Boyd

Maintains "new pump" clearances for years with adjustable TIMKEN® bearings

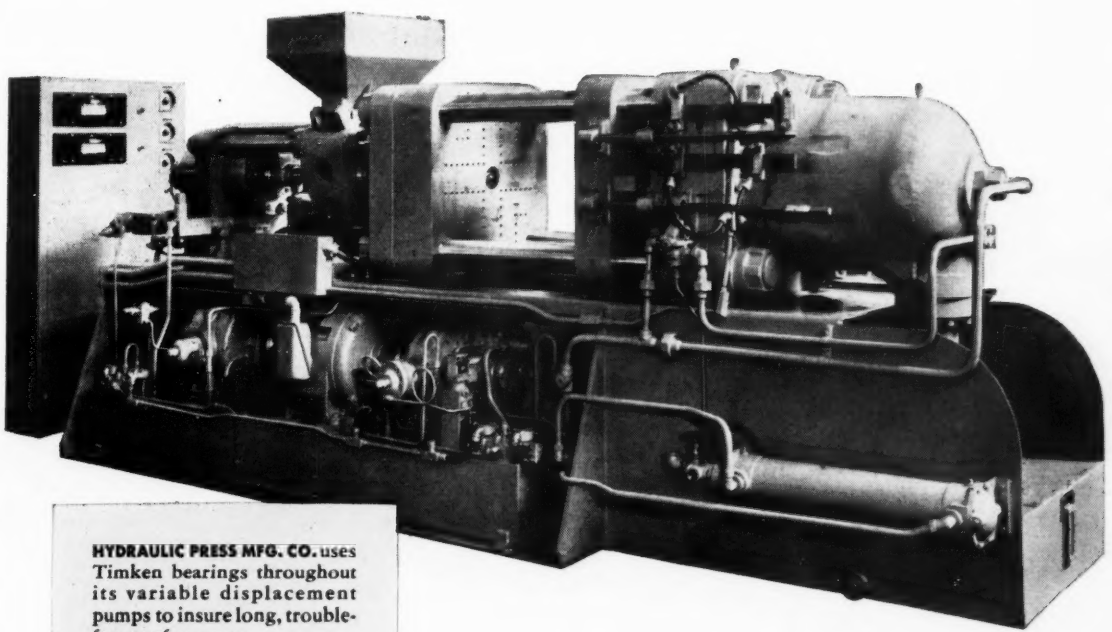
THE "heart" of this H-P-M plastics injection molding machine is the variable displacement pump that powers both the injection unit and the hydraulic mold clamp. Built to precision standards, the pump will maintain "new pump" clearances for years because Hydraulic Press Mfg. Co. engineers specified Timken® tapered roller bearings throughout the pump.

Because of their tapered construction, Timken bearings take radial and thrust loads in any combination. This, plus precision manufacture, permits Timken bearings to maintain an extremely close clearance between pintle and rotor.

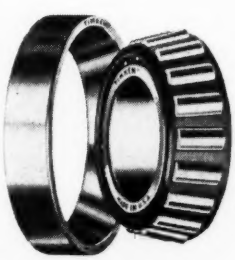
Timken tapered roller bearings normally last the life of the pump because they're engineered for the job and made of special analysis Timken fine alloy steel.

You get these same benefits in the machinery you build or buy when you specify Timken bearings. Make sure the trade-mark "Timken" is stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



HYDRAULIC PRESS MFG. CO. uses Timken bearings throughout its variable displacement pumps to insure long, trouble-free performance.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roller ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

NOT JUST A BALL ◯ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ↕ AND THRUST → ← LOADS OR ANY COMBINATION →

C. C. Randolph, Jr., will assume responsibility for raw material and container purchases for the Calco Division, according to W. C. Harmon, Jr., divisional manager of purchases, American Cyanamid Co. This will be in addition to his other duties as assistant to Mr. Harmon. Randolph joined the sales organization of Barrett Co. in 1925 and became president of U. S. Tar Co. in 1933. He was assistant sales manager of chemical sales for Pittsburgh Coke & Chemical Co., 1940-43. After service in the Naval Air Command from 1943 to 1946, Randolph came to Calco as assistant manager of the Willow Island, W. Va., plant and in 1951 was appointed assistant to the manager of purchases, Calco Division.

C. H. Caldwell has been promoted at The B. F. Goodrich Co., Akron, O., to petroleum account supervisor. Caldwell joined the Goodrich sales promotion department in 1944. He handled several assignments in the advertising department until 1949, when he became assistant manager of passenger tire sales.

John B. Calkin, chemical engineer and consultant with offices in New York, N. Y., has been named assistant to the president, Foster D. Snell, Inc., 29 W. 15th St., New York, N. Y. He will also be director of market research. This appointment follows a longtime connection of Mr. Calkin with the firm. He was recently associated with the University of Maine, where he was director of the Department of Industrial Cooperation and secretary, The University of Maine Pulp & Paper Foundation. He is an associate professor of chemical engineering.

Lowell N. George, former head of the economics department at Muskingum College, is now a member of the supervisional training staff, Goodyear Tire & Rubber Co., Akron, O., and is serving as a conference leader.

A. Beverley Lewis has been appointed a director and vice president in charge of development of British Rubber Co., Ltd., Montreal, P.Q. (a division of Mailman Corp., Ltd.). Mr. Lewis until recently was with Armstrong Cork Canada, Ltd., as factory manager, at Montreal.

A. Beverley Lewis

William B. Beeson, Jr., of Diamond Alkali Co.'s sales organization, has been named sales manager of the company's new subsidiary, Belle Alkali Co., Belle, W. Va., with headquarters at the company's main office at 300 Union Commerce Bldg., Cleveland 14, O. Mr. Beeson's sales career with Diamond, dating back to 1933, was interrupted only by World War II, when he served as a major in the U. S. Army Air Corps. Originally assigned to Diamond's Cincinnati branch sales office, Mr. Beeson was transferred in March, 1948, to the Pittsburgh branch office, where shortly thereafter he was promoted to assistant branch manager.

William E. Flack, controller for Acushnet Process Co., New Bedford, Mass., has been elected to membership in the Controllers Institute of America, New York 17, N. Y.

Albert E. Maibauer has been appointed manager, wire and cable materials division, by Bakelite Co., a Division of Union Carbide & Carbon Corp., New York, N. Y. Mr. Maibauer, who joined Bakelite in 1925, was previously assistant to the manager of the New York sales development group.

John G. Broughton, Jr., has been named to head Midwest sales for the organic chemicals division of Dewey & Almy Chemical Co., Cambridge, Mass. Mr. Broughton, whose promotion is part of the division's continuing sales expansion program, will handle sales of all Darex organic chemicals to the paint, paper, textile, rubber, and chemical industries in the Midwest. He will headquarter at Dewey & Almy's plant in Chicago, Ill. Prior to joining the company in 1952 as a salesman, Mr. Broughton was a technical sales representative for Shell Chemical Corp., and before that time had been with Eastman Kodak Co.

Giorgio Lupi, representing Soc. Lupi & C., 27 Via Fratti, Milan, Italy, who is interested in ebonite and rubber processing and also in the manufacture and applications of reinforcing plastics, is on a short visit to the United States, where he may be reached at the Vanderbilt Hotel, New York, N. Y.

F. B. Case is now works manager of Kirkhill, Inc., 12021 Woodruff Ave., Downey, Calif. He was formerly factory manager at Essex Rubber Co. for a number of years. His previous experience covers similar positions with Dural and Arrowhead Rubber Co.

Clarence W. Higbee, manager of United States Rubber Co.'s wire and cable department, mechanical goods division, recently received the honorary degree of civil engineer from Rensselaer Polytechnic Institute at commencement exercises in Troy, N. Y. Mr. Higbee, who was elected president of the National Electrical Manufacturers Association in 1950, has been with the rubber company since his release from the Army in 1919, when he started as a sales clerk. He has progressed through positions of increasing responsibilities and has received various forms of recognition from business and professional colleagues for "his able application of engineering principles and executive ability."

Robert C. Brady

Robert C. Brady has been made New York office manager for Farrel-Birmingham Co., Inc., Ansonia, Conn., to succeed Carl ter Weele, resigned. Mr. Brady's headquarters are in the F-B office, Chrysler Bldg., New York, together with those of A. C. Meyers, of Consolidated Machine Tool Corp., a wholly owned subsidiary of Farrel-Birmingham. Mr. Brady first joined Farrel in May, 1949. Previously he had served as a U. S. Naval officer in World War II following graduation from the U. S. Naval Academy, Annapolis. In June, 1951, he was granted a leave of absence to serve with the U. S. Naval Force in Germany. This assignment terminated in May, 1953, and, after rejoining Farrel-Birmingham, Brady was appointed New York office manager, effective July 1.

Burton B. White has been named supervisor of silicone rubber sales development for General Electric Co.'s silicone products department at Waterford, N. Y., and will serve as consultant to design engineers in automotive, aircraft, and other industries using silicone rubber parts. Mr. White joined the company in 1946 as a chemist at Bridgeport, Conn. He later transferred to the Trenton, N. J., plant as laboratory supervisor on design and materials engineering work. In 1951 he became an application engineer at Waterford, providing technical service to fabricators of silicone rubber.

Arthur V. Peterson, formerly with the Atomic Energy Commission, has joined the staff of the vice president in charge of engineering of American Machine & Foundry Co., 511 Fifth Ave., New York 17, N. Y. Mr. Peterson, who spent more than 10 years in the U. S. atomic energy program, will concentrate on the expansion of American Machine & Foundry activities in the atomic energy field. The company has already had considerable experience in atomic energy, having designed and developed specialized electronic and mechanical equipment for the Savannah River Project and other atomic energy activities.

George E. Shepherd has been appointed northern New Jersey sales representative for the silicone products department of General Electric Co., Pittsfield, Mass. Mr. Shepherd will maintain offices at 570 Lexington Ave., New York, N. Y.

Get Better Physicals and Lower Costs with These Sun Process Aids

In compounding and processing natural and synthetic rubbers, you can depend on the quality of these Sun "Job Proved" Products. And there's a Sun Rubber Process Aid to satisfy your every requirement.

PRODUCT	WHERE YOU CAN USE IT
CIRCO LIGHT PROCESS AID A general-purpose naphthenic type softener.	In the manufacture of nonstaining reclaims and butyl inner tubes. For Neoprene and natural rubber.
CIRCOSOL-2XH An elasticator composed of special hydrocarbon structures derived from petroleum.	In the manufacture of oil-extended polymers. As a plasticizer and softener for compounding GR-S polymers, natural rubber and combinations of the two.
CIRCOMAR-5AA A free-flowing, dark liquid softener of the asphalt-flux type.	In the manufacture of tires of natural rubber, GR-S polymers, or blends of these two.
CIRCOMAR-25 A heavy, viscous, dark liquid softener of the asphalt-flux type.	In the manufacture of tires of natural rubber, GR-S polymers, or blends of these two.
CIRCOMAR-110 A very low-cost soft asphaltum.	In the manufacture of tires.
SUNDEX-53 A low-cost, relatively aromatic product highly compatible with natural rubber and GR-S polymers.	In the manufacture of oil-extended polymers. In the processing of tires, rubber footwear, matting, toys, semihard rubbers, etc. In extending high Mooney viscosity Neoprene WHV.
SUNDEX-41 A complex dark-colored blend of high mol. wt. petroleum fractions and a specially prepared asphaltum, all derived from selected sources.	For processing "cold rubber."
516 RUBBER PROCESS AID A highly paraffinic type product.	In the manufacture of butyl inner tubes.
PDO 40 RECLAIMING AID A dark-colored product composed of polymerized olefinic hydrocarbons generally cyclic in character.	As a reclaiming agent.
SUNAPTIC ACID A saturated high mol. wt. type naphthenic acid.	In Neoprene latex compounds to eliminate irregularities in the surface of coagulated dip films. As an activating agent in the curing of rubber. May be used as a direct replacement for stearic acid.
SUNOCO ANTI-CHEK A tailor-made petroleum wax.	For protecting rubber from surface cracking caused by sunlight, ultraviolet light, ozone.
SUNOCO WAXES 1290 Yellow 1290 Brown Carefully refined microcrystalline waxes having a melting point of about 180 F.	As mold releasing agents.

For information on these process aids or Sun's "Job Proved" lubricants for rubber-process machinery call your nearest Sun Office or write SUN OIL COMPANY, Phila. 3, Pa., Dept. RW-8.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

SUNOCO®

PHILADELPHIA 3, PA. • SUN OIL COMPANY LTD., TORONTO & MONTREAL

Milton H. Mettee, III, has been appointed branch manager, metropolitan sales district, for Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J. Mettee joined the Division in 1932 as a New England sales representative for the dyestuff department and was transferred to the metropolitan sales district in 1946 as senior sales representative to the fast-growing plastic industry.

Walter F. Brown has been named Chicago area sales representative for the General Electric Co.'s silicone products department, with headquarters at the company's chemical division offices at 840 S. Canal St., Chicago, Ill. Before joining G-E, Mr. Brown was engaged in technical sales service work for the Socony-Vacuum Oil Co. at Chicago.

C. W. Mitchell has been appointed executive vice president of Nyotex Chemical Co., Houston, Tex. Mr. Mitchell spent 17 years with the Missouri Pacific Railroad and has been with Consolidated Chemical Industries, Inc., for 24 years. He was vice president of Nyotex prior to his appointment. Nyotex Chemical, which manufactures aluminum chloride, hydrofluoric acid, and lime, is a mutually owned subsidiary of Consolidated Chemical, Stauffer Chemical Co., and Harshaw Chemical Co.

J. E. Brister has been named manager of the molding and extrusion materials department of Bakelite Co., a division of Union Carbide & Carbon Corp., New York, N. Y. Mr. Brister will be responsible for the sale of all molding and extrusion materials including phenolics, polystyrene, polyethylene, and vinyls used for these applications as well as wire and cable materials. Mr. Brister, who joined Bakelite in 1933, was formerly manager of the wire and cable materials division and succeeds John D. Benedito.

William S. Richardson, executive vice president of The B. F. Goodrich Co., has been elected a director of The Rubber Manufacturers Association, Inc., New York, N. Y., to succeed **James J. Newman,** who, upon his retirement from Goodrich as vice president, also resigned from the RMA board. Both this resignation and that of **Frank D. Hendrickson,** former president of the American Hard Rubber Co., were accepted by the board with regret. The vacancy left by Mr. Hendrickson's resignation has not yet been filled.

James J. Newman, who retired recently as a vice president of The B. F. Goodrich Co., was guest of honor at a luncheon-meeting of the directors of The Rubber Manufacturers Association, Inc., held June 30 at the Waldorf-Astoria Hotel, New York, N. Y.

Thomas Hayes has been appointed light mechanical development manager at the Boston Woven Hose & Rubber Co., Cambridge, Mass., and will be in charge of research and development of such products as friction tape, matting, treads, packing, etc. Mr. Hayes was formerly with Canadian Industries, Ltd., and Westinghouse Electric Corp. With both these firms he was engaged in development work. After coming to the United States in 1950, Mr. Hayes was a consultant industrial engineer.

Chester T. Morledge has been named general manager, merchandising, for The B. F. Goodrich Co. Tire & Equipment Division. Morledge has been with the company since June, 1936, when he started in the automobile tire department. In 1937, Morledge became assistant manager of BFG's automobile tire department and manager in June, 1940. In March, 1943, he was appointed manager of the newly organized auto and home supplies department, with full authority to set up that department's operations. Prior to joining Goodrich he had been with India Tire Co., where he served as vice president in charge of sales.

James L. Naylor has been appointed manager of the dyestuff department, Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J. He succeeds **J. Pfister,** who will continue active in the affairs of the company, giving his time to its New England business, and be available for special assignments. Naylor was associated with the textile manufacturing industry for several years prior to joining the Calco dyestuff sales organization in 1929. He was appointed Manager of the Providence, R. I., branch office 1938 and in 1945 was made assistant manager of the dyestuff department.

John D. Benedito has been named assistant general sales manager of Bakelite Co., a division of Union Carbide & Carbon Corp., 260 Madison Ave., New York 16, N. Y. Mr. Benedito, who joined Union Carbide in 1935, was previously manager of the molding and extrusion materials department.

A. W. Rose has been made Pacific Coast representative of Borg-Warner Corp., Chicago, Ill., and has resigned as vice president and assistant general manager of that corporation's Warner Gear Division. Mr. Rose will establish his offices in Los Angeles, Calif., from where he will serve Borg-Warner's interests in financial and manufacturing circles in the Far West.

Clyde S. Gischel, former tire sales manager with the Firestone Tire & Rubber Co., Akron, O., has been appointed general manager of consumer products for Westinghouse Electric Supply Co., New York, N. Y., and will be responsible for consumer product sales in the company's 17 districts and 112 branch offices across the country.

W. P. Frisco was recently appointed vice president and technical director of Duroflex, Inc., Buena Vista, Va. Mr. Frisco, with a group, helped organize and start Duroflex in production on gas meter diaphragms and related products. He was formerly technical director of St. Clair Rubber Co., Marysville, Mich., and factory manager of Vulcan Rubber Products Co., Brooklyn, N. Y.

Dwight L. Allen has been named manager, American Anode sales, for The B. F. Goodrich Co.—industrial products division. He has been with the company since 1936, when he joined the latex compounding department of American Anode. He moved to the sales department in 1940 and to a supervisory capacity in 1942, a position he retained until his new appointment.

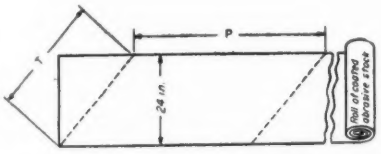
S & T Activities

(Continued from page 648)

How to Cut Spiral-Wound Abrasive Drum Covers

THE use of spirally wound abrasive covers on drum grinders for facing wide web sheets of plastic and rubber has caused some attention to be directed toward devising a simple means by which machine operators or maintenance personnel may replace worn covers with a minimum loss of coated abrasive stock. Behr-Manning Corp., Troy, N. Y., has advanced such a system for the two basic types of drum grinders: the smooth surface machine in which the coated abrasive is butt-wrapped, and the spirally grooved surface drum in which the abrasive is overlapped along the spiral.

In this scheme the length and the diameter of the drum are the only dimensions required for the simple calculations involved. For the butt-wrapped machine, the length of the angle cut or taper of the stock, T (*see accompanying illustration*), is equal to the circumference of the drum, and the length of the abrasive cover, P, is the area of the drum divided by the width of the coated abrasive.



Sketch for Cutting Abrasive Stock

For the spirally grooved drum, however, the taper is equal to the circumference of the drum plus the width of the overlap measured perpendicular to the axis of the cylinder. The area is then calculated, using T as the circumference. P equals this area divided by the width of the stock.

The T dimension is used, of course, only when a new roll of stock is begun. Otherwise use of the P dimension will suffice.

Our Apologies to the Ladies

ON PAGE 500 of our July issue we ran a photograph showing Mrs. C. C. Davis and two other ladies seated at a table during the banquet of the Rubber Division, A. C. S., in Boston on May 28. Our caption said that Mrs. Waldo Semon was seated on Mrs. Davis's left and Mrs. S. G. Byam on her right.

Mrs. Byam was seated on Mrs. Davis's left, while Mrs. J. C. Walton is on her right. India RUBBER WORLD apologizes for getting its left and right mixed up and the ladies incorrectly identified.

Rubber Technology Conference in London in June, 1954

THE Institution of the Rubber Industry, London, England, plans to hold its third Rubber Technology Conference in London on June 22-25, 1954. Emphasis will be placed on those topics in which there have been

THE HISTORY OF THE RUBBER INDUSTRY—Number 4

how long did it take to get from here to here?

Answer: Four Years

In 1916, solid rubber truck tires outnumbered pneumatics 60 to 1, but World War I demonstrated the superiority of pneumatics. As old trucks wore out after the 1920 depression—four years later—and business picked up, the solids began disappearing. By 1941, only one truck tire in 10,000 was a solid.

Many Monsanto products have aided the progress of the Rubber Industry.

FLECTOL H, for example, is a Monsanto antioxidant for natural and synthetic rubber. Flectol H is an excellent protector against heat deterioration and normal aging. It causes less discoloration than most other full-power antioxidants.

Write for booklet "Monsanto Chemicals for the Rubber Industry." Address: MONSANTO CHEMICAL COMPANY, Rubber Chemical Sales, 920 Brown Street, Akron 11, Ohio.

MONSANTO CHEMICALS FOR THE RUBBER INDUSTRY

ANTIOXIDANTS

Flectol* H
Santoflex* B
Santoflex BX
Santoflex 35
Santoflex AW
Santowhite* Crystals
Santowhite MK
Santowhite L

ALDEHYDE AMINE ACCELERATORS

A-32
A-100

MERCAPTO ACCELERATORS

Santocure*
El-Sixty*
Mertax (Purified Thiotax)
Thiotax (2-Mercapto benzothiazole)
Thiofide* (2,2' dithio-bis benzothiazole)

GUANIDINE ACCELERATORS

Diphenylguanidine (D.P.G.)
Guantal*

ULTRA ACCELERATORS FOR LATEX, ETC.

R-2 Crystals
RZ-50
RZ-50-B
Pip-Pip
Thiurad* (Tetramethyl-thiuram disulfide)
Ethyl Thiurad (Tetraethyl-thiuram disulfide)
Mono Thiurad (Tetramethyl-thiuram monosulfide)
Methasan* (Zinc salt of dimethyl dithiocarbamic acid)
Ethasan* (Zinc salt of diethyl dithiocarbamic acid)
Butasan* (Zinc salt of dibutyl dithiocarbamic acid)

WETTING AGENTS AND DETERGENTS

Areskap* 50
Aresklene* 375
Santomerse* S
Santomerse D

SPECIAL MATERIALS

Thiocarbanilide ("A-1")
Santovar*-A
Santovar-O
Sulfasan R
Insoluble Sulfur "60"

COLORS

REODORANTS

*Reg. U.S. Pat. Off.

MONSANTO
CHEMICALS – PLASTICS

SERVING INDUSTRY...WHICH SERVES MANKIND

important recent advances. Subjects to be included in the program deal with the production, evaluation, analysis, physics, and chemistry of natural and synthetic rubbers and latices. Plastics of interest to the rubber industry, fibers and textiles, compounding ingredients, and factory techniques and products will also be discussed.

It was decided to extend the length of the Conference to four days and to limit the number of papers accepted in order to eliminate the necessity of holding simultaneous meetings, a practice considered undesirable. It is expected that this arrangement will enable a more coherent discussion to be planned.

Prospective contributors of papers have been asked to submit a 300-word summary not later than October 1, 1953, in order that compilation of the program be facilitated. Authors of those summaries which are selected will be invited to submit full papers prior to February 1, 1954. Preprints of these texts will be circulated in advance of the conference to enable the maximum time to be devoted to discussion.

Kel-F in Electron Tubes

THE trifluorochloroethylene polymer known as Kel-F, product of The M. W. Kellogg Co., Jersey City, N. J., is currently being used as insulation for miniature sockets of electron tubes. This insulation consists of a cylindrical section that fits over the base of the tube plus a series of raised ridges attached to the section which act as insulating barriers between connectors. The miniature socket insulation is injection molded by Elco Corp., Philadelphia, Pa.

Use of Kel-F in this capacity and the extension of the height of the insulating barriers between connectors are claimed to have resulted in an increase in the performance altitude ceiling of the tube by 15%. This improvement is said to be due to the high dielectric strength of the material which prevents ionization and arc-over at the connectors, factors which previously had precluded use of the tubes at the higher altitudes. Another advantage gained through use of the polymer is the ability of the insulating barriers to withstand heavy shock and vibration without damage, due to the high mechanical strength of the plastic.

Kel-F is also being extruded by Garrison Co., Fanwood, N. J., in the form of covers or sleeves for carbon resistors. The sleeves are said to resist carbonization and distortion up to temperatures of 390° F.; they will remain transparent indefinitely to permit ready identification of the resistor, are non-flammable, and are dimensionally stable down to —320° F., it is further claimed. The product is available in 0.178- to 0.302-inch inside diameter sizes in lengths from ½-inch to 3¼ inches.

New Rayon Tire Yarn

"SUPER CORDURA," a new high-tenacity rayon tire yarn which provides added strength and toughness in tires was announced by the textile fibers department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., at a press conference in New York, N. Y., July 15. The result of eight years of research, including evaluation tests in tires since 1950, the new yarn is said to be *20%* stronger and have substantially greater fatigue resistance than existing high-tenacity rayon yarn. In addition to permitting the manufacture of tires having greater carcass strength, "Super Cordura" can be used to make thinner truck and bus tires which will operate at lower temperatures because of reduced heat build-up.

C. H. Rutledge, manager of product information for the textile fibers department, presided over the conference, and the speakers included L. S. Sinness, sales division director, who made the announcement; W. W. Owen, rubber industry customer service, who described the use of the new yarn in tires; and E. A. Tippetts, director of the rayon research division, who spoke on research aspects. The new yarn was said to require a basic change in rayon manufacture.

According to Dr. Sinness, "'Super Cordura' even has a differently shaped filament cross-section which, under microscopic examination, shows as being predominantly skin. It is the skin that gives toughness to the fiber."

A comparison of the properties of "Super Cordura" and current high-tenacity rayons is shown in the following table:

	"Super Cordura"	Current H. T. Rayons
Yarn (1650 denier)		
Tenacity, gm. per denier		
Conditioned (12% moisture regain)	4.40	3.5–3.9
Wet	3.05	2.0–2.5
Loop	3.30	2.5–3.0
Ratio, wet/conditioned	0.69	0.56–0.63
Cord (1650/2, 11Z/11S twist)		
Tenacity, gm. per denier		
Conditioned (12% moisture regain)	3.40	2.6–2.9
Over dried	3.75	3.2–3.3
Extensional fatigue rating	200–300	50–150
Conversion strength (yarn to cord), %	77	70–76
Strength ratio, oven dried/conditioned	1.10	1.14–1.24

A unit of du Pont's Spruance plant at Richmond, Va., is being converted to produce "Super Cordura," and first shipments will be made in September. The unit will not reach full production until January, at which time it will have a capacity of 50,000,000 pounds a year, approximately one-half the company's total rayon yarn productive capacity. The new yarn, in 1650 denier, will be priced at 67¢ a pound, as compared with 61¢ for regular high-tenacity rayon yarn and $1.65 for nylon tire yarn.

Dr. Sinness acknowledged that "Super Cordura" will compete with nylon tire cord in some markets, but "my company feels it is better to compete with ourselves than be put out of business by somebody else."

Use for Nut Shells

THE United States Department of Agriculture has announced a new use for the shells of nuts and the pits of fruits. In a recent publication[1] the Department reports that relatively coarse particles of hard shells can be incorporated into auto and tractor tire treads to give superior non-skid and traction properties, and that finely ground shells of most nuts and fruit pits are excellent as fillers in plastic molding compounds. Use of this material is claimed to be economically feasible owing to the large quantities which accumulate as residue at nut shelling and food processing plants.

[1] USDA publication AIC 352, Bureau of Agricultural & Engineering Chemistry, United States Department of Agriculture, Washington 25, D.C.

OBITUARY

Theodore Whittelsey, Sr.

THEODORE WHITTELSEY, SR., industrial chemist and former director of United States Rubber Co.'s central research laboratory, died June 26 at Philadelphia, Pa., at the age of 85.

Dr. Whittelsey joined the U. S. Rubber organization in 1909, having previously taught chemistry at Cornell University and Northwestern University. In 1913 he became head of the company's first central research laboratory, then in New York. This was the first research laboratory organized by a large rubber company and housed in a separate building.

After his retirement in 1920, Dr. Whittelsey acted as a consultant for several companies. Many colleges used a book written by him on qualitative analysis.

During World War I the deceased was a civilian adviser on a Navy Department committee in charge of developing gas masks.

Surviving are a son, two daughters, and a sister.

Bruno Marzetti

WORD has just been received from Italy of the death, on March 27, in Turin, of Bruno Marzetti, noted Italian rubber technologist.

Giordano Bruno Marzetti was born in Pesaro on January 9, 1884. He attended the University of Pisa, which conferred degrees in physics upon him in 1908. Later he joined the Physical Institute of Turin University.

But the most important part of his work was done at the Pirelli laboratories in Milan from 1920 to 1925. The studies which made him known mainly relate to the measurement of raw rubber plasticity and the accelerated aging of vulcanized rubber. Here he also developed the plastometer which bears his name and an accelerated aging oven. Dr. Marzetti, moreover, conducted unpublished studies on hardness, heat development due to hysteresis and dynamometric traction, for which he devised a dynamometer having high traction speed. He also contributed to the Italian standardization of rubber tests and wrote many articles of interest to the rubber industry.

N. J. Hooper

N. J. HOOPER, who retired in 1951 as vice president and director of Sharples Chemicals, Inc., Philadelphia, Pa., passed away July 19. He had served in various capacities in the Sharples sales department for 25 years.

Prior to joining Sharples Chemicals he had been associated in sales and managerial work with Sharples Corp. and the Cotton Oil Refining Co., Portsmouth, Va.

Mr. Hooper was a graduate of the University of Wisconsin, Class of 1917.

He then saw military service in World War I as an officer of the Chemical Warfare Service.

After his retirement from Sharples he became special assistant to the President of Temple University, Philadelphia. He had been a member of its board of trustees since 1944.

Prevent scorching even in hot weather with non-discoloring

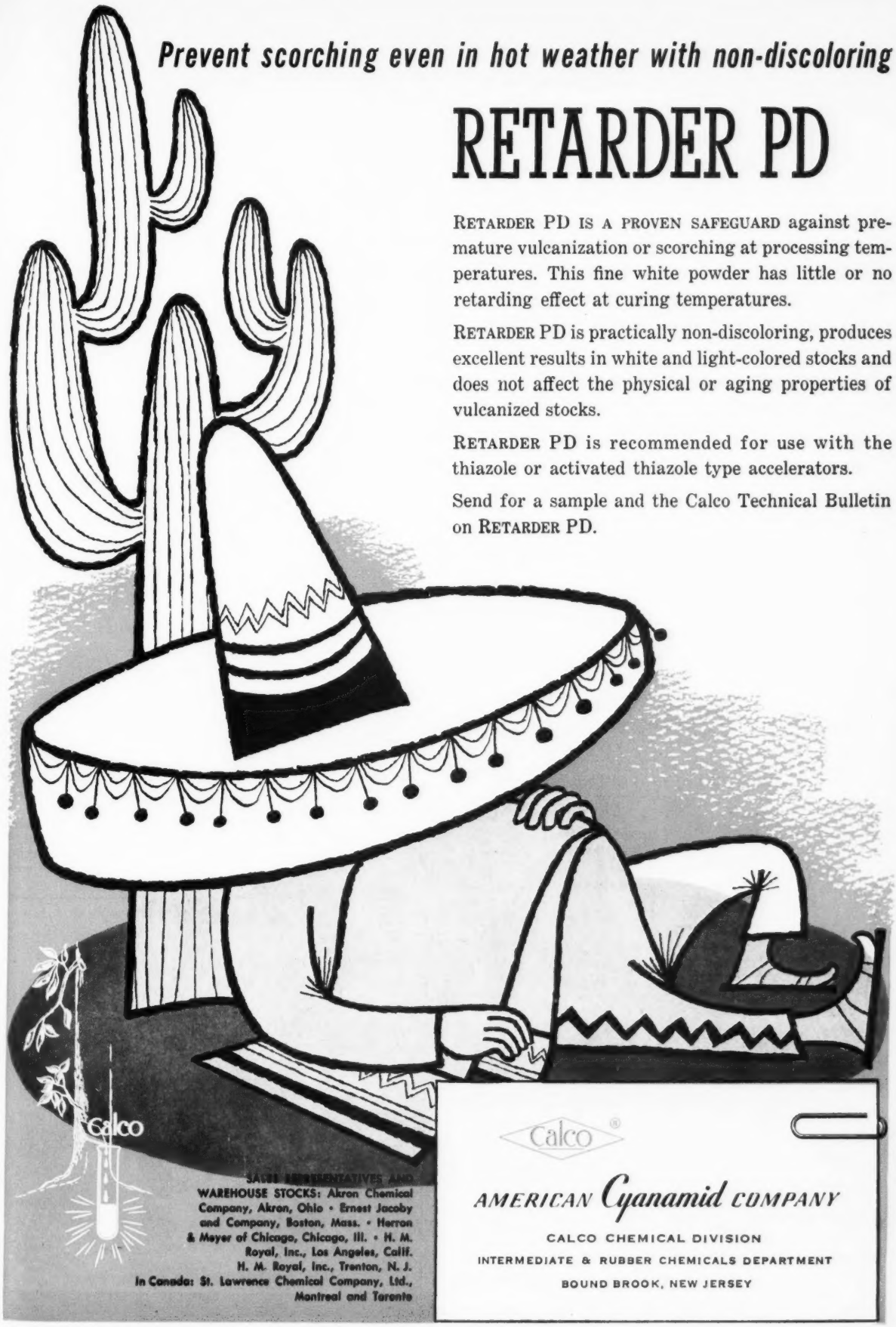
RETARDER PD

RETARDER PD IS A PROVEN SAFEGUARD against premature vulcanization or scorching at processing temperatures. This fine white powder has little or no retarding effect at curing temperatures.

RETARDER PD is practically non-discoloring, produces excellent results in white and light-colored stocks and does not affect the physical or aging properties of vulcanized stocks.

RETARDER PD is recommended for use with the thiazole or activated thiazole type accelerators.

Send for a sample and the Calco Technical Bulletin on RETARDER PD.



SALES REPRESENTATIVES AND WAREHOUSE STOCKS: Akron Chemical Company, Akron, Ohio • Ernest Jacoby and Company, Boston, Mass. • Herron & Meyer of Chicago, Chicago, Ill. • H. M. Royal, Inc., Los Angeles, Calif. H. M. Royal, Inc., Trenton, N. J. In Canada: St. Lawrence Chemical Company, Ltd., Montreal and Toronto

Calco®

AMERICAN Cyanamid COMPANY

CALCO CHEMICAL DIVISION

INTERMEDIATE & RUBBER CHEMICALS DEPARTMENT

BOUND BROOK, NEW JERSEY

There's a **BIG DIFFERENCE** in Plasticizers, too!

NEW!

RC PLASTICIZER 0-16 DIFFERS FROM MOST FATTY ACID ESTER PLASTICIZERS IN POSSESSING:

1 **Resistance to Oxidation and Rancidity!**
2 **Low Acidity!**
3 **High Degree of Water Insolubility!**
4 **Excellent Electrical Properties!**

Now commercially available, RC PLASTICIZER 0-16 (ISO-OCTYL PALMITATE) is a saturated lubricant-type secondary plasticizer for Polyvinyl Chloride.

Specify RC PLASTICIZER 0-16 and you'll find a *big* difference if your product is one of the following:

Film and Sheeting
Low Viscosity Plastisols
Electrical Extrusions
Fabric Coatings
Natural and Synthetic Rubbers
Molded Articles

RUBBER CORPORATION OF AMERICA ALSO SUPPLIES THESE OUTSTANDING PLASTICIZERS

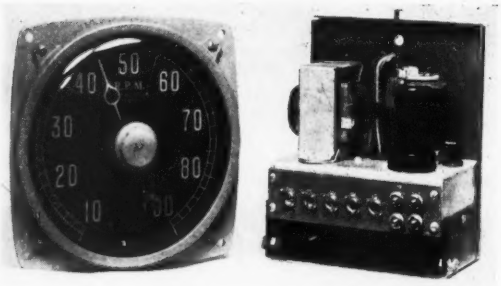
DIOP (DI-ISO-OCTYL PHTHALATE)
DIOA (DI-ISO-OCTYL ADIPATE)
ODP (ISO-OCTYL ISO-DECYL PHTHALATE)
DBP (DIBUTYL PHTHALATE)
TG-8 (TRIETHYLENE GLYCOL DI(CAPRYLATE)
DIOS (DI-ISO-OCTYL SEBACATE)

WRITE TODAY FOR SAMPLES AND BROCHURE ON RC PRODUCTS

RC RUBBER CORPORATION OF AMERICA

274 Ten Eyck St., Brooklyn 6, N. Y. • 111 W. Monroe St., Chicago 3, Ill.
SALES REPRESENTATIVES: Ernest Jacoby & Co., 79 Milk St., Boston 9, Mass. Charles Larkin II, 250 Delaware Avenue, Buffalo 2, N.Y.

New Machinery



Speed Monitor Dial *(Left)* and Relay Mechanism

Speed Monitor

A NEW speed monitor which operates on the principle of the mechanical tachometer has been announced by Jones Motrola Corp., Stamford, Conn. The unit is claimed to provide an accurate, direct indication of the speed of a machine and to be capable of controlling this speed within maximum and minimum limits. Reportedly independent of heat, moisture, magnetic currents, etc., this monitor can also actuate relays and solenoids to perform various functions.

The head of the unit is driven by flexible shaft and gears from any machine shaft. The maximum and the minimum speeds may be set independently by means of pointers or contacts, with the instrument pointer acting as the center arm of a single pole double-throw switch. The amount of the current across the pointer contacts is approximately three microamperes, and the relay will break up to 350 watts. The unit operates on 115 volts A.C., 60-cycle single-phase, but can also be supplied to operate on 35 or 70 volts D.C.

German-Developed Grinding Mill

THE Turbo-Mill, a grinding and pulverizing machine of radical design, is now available in the domestic market. The machine was originally developed by the Pallman Machinery Co., Zweibruecken, Germany, which is represented here by Turbo-Mill Co. Exclusive distributor of the Turbo-Mill in the United States and Canada is A. E. Poulsen & Co., Los Angeles, Calif.

The machine uses a ricochet action in grinding and pulverizing, in addition to the principles of compression, impact, attrition, cutting, and shredding. Miniature windstorms of 360 feet a second are created and controlled inside the Turbo-Mill, and this turbu-

Quality!
SEE PAGE 560

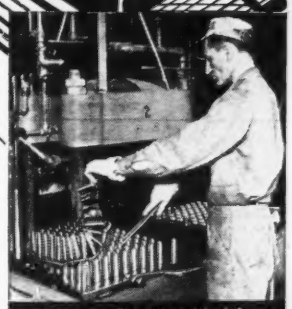
DOW CORNING Mold Lubricants Add Sales Appeal

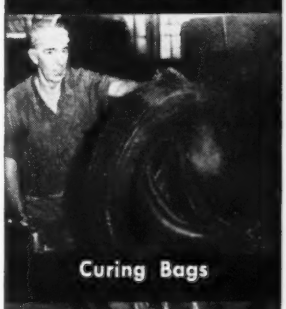
"Show 'em and sell 'em!"

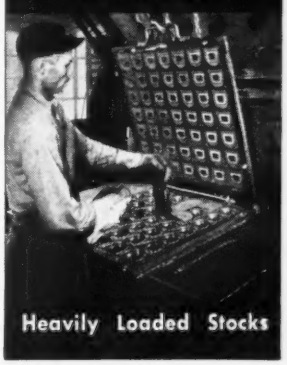
Experienced salesmen know that product appearance is often the deciding factor in successful selling. And experienced pressmen know that clean, easy release is a deciding factor in successful production.

Get 'em both with Dow Corning silicone mold lubricants. Your molds stay cleaner longer, and they produce parts with a high glossy finish that's bound to mean greater customer appeal. That's because these silicone release agents can't break down at molding temperatures to form a carbonaceous build-up. Non-flammable and non-corrosive, they help cut mold cleaning costs as much as 80%. Scrap is reduced to the vanishing point.

Specify Dow Corning silicone mold release agents today. Fluids for green carcass, bead and parting line release; emulsions for molds, mandrels and curing bags.


Deep Cavity Molds


Curing Bags


Heavily Loaded Stocks

Dow Corning Silicones Mean Business!

For more information, call our nearest branch office or write direct for data sheet M-8.

DOW CORNING SILICONES

DOW CORNING CORPORATION
MIDLAND, MICHIGAN

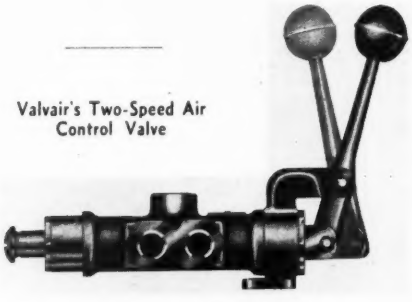
ATLANTA CHICAGO CLEVELAND DALLAS DETROIT LOS ANGELES NEW YORK WASHINGTON, D. C. (Silver Spring, Md.)

In Canada: Fiberglas Canada Ltd., Toronto In Great Britain: Midland Silicones Ltd., London

Eagle-Picher pigments
serve the rubber industry
across the board
Eagle-Picher manufactures a comprehensive line of both lead and zinc pigments for the rubber industry. The quality and uniformity of our pigments, exact quality control methods of manufacturing, more than a century of experience... are the factors that make Eagle-Picher serve you better.
Zinc Oxides • Basic White Lead Silicate
Basic Carbonate of White Lead
Sublimed White Lead
Litharge • Sublimed Litharge
Red Lead (95%, 97%, 98%)
Sublimed Blue Lead
On the Pacific Coast:
Associated Lead & Zinc Co.
2700 16th Avenue, S. W.
Harbor Island, Seattle 4, Washington
EAGLE EP PICHER
THE EAGLE-PICHER COMPANY
Since 1843
GENERAL OFFICES: CINCINNATI (1), OHIO

Turbo-Mill Grinder and Pulverizer

lence contributes to the rapid grinding of almost any material into a fine powder. The machine is said to grind and pulverize a wide range of materials more efficiently, faster, and at lower cost than has been possible heretofore. Turbo-Mills are claimed to be in use in more than 500 European industries to grind and pulverize chemicals, rubber, pigments, ores, wood, limestone, peat, agricultural products, and other materials.



Valvair's Two-Speed Air Control Valve

Air Control Valve

THE Valvair Corp., Akron, O., has added a new air control valve, which has two speed controls built into the valve body, to its line of air control valves. The advantages claimed for built-in controls over separate control units are simpler piping for the unit, and a cost saving of more than 50% on the purchase of equipment. The principal use of the control valve, which is available in a standard four-way piped exhaust model, is to control the stroke of an air cylinder. The valve, currently being produced in the ⅜-inch pipe size, can be actuated by knob, lever, clevis, treadle, foot, cam, cylinder, solenoid, or diaphragm controls.

Literature on New Machinery

"Holmes Sponge Rubber Vulcanizing Press." Stanley H. Holmes Co., Chicago, Ill. 6 pages. The operation of the press is described and illustrated in this pamphlet.

"The Olsen Line of Super 'L' Universal Testing Machines." Bulletin 47. Tinius Olsen Testing Machine Co., Willow Grove, Pa. 22 pages. Detailed information on the two complete lines of the company's Super "L" testing machines, the standard and De Luxe models, plus a description of the principle and operation of Olsen's electronic indicating system, are given in this publication.

"Richardson E-20 Constant Weight Continuous Feeder." No. 5202. Richardson Scale Co., Clifton, N. J. 2 pages. This catalog insert contains specifications and illustrations of the feeder which is designed to handle dry, free-flowing, and ground bulk materials.

MARBON'S NEW CREPE BAG

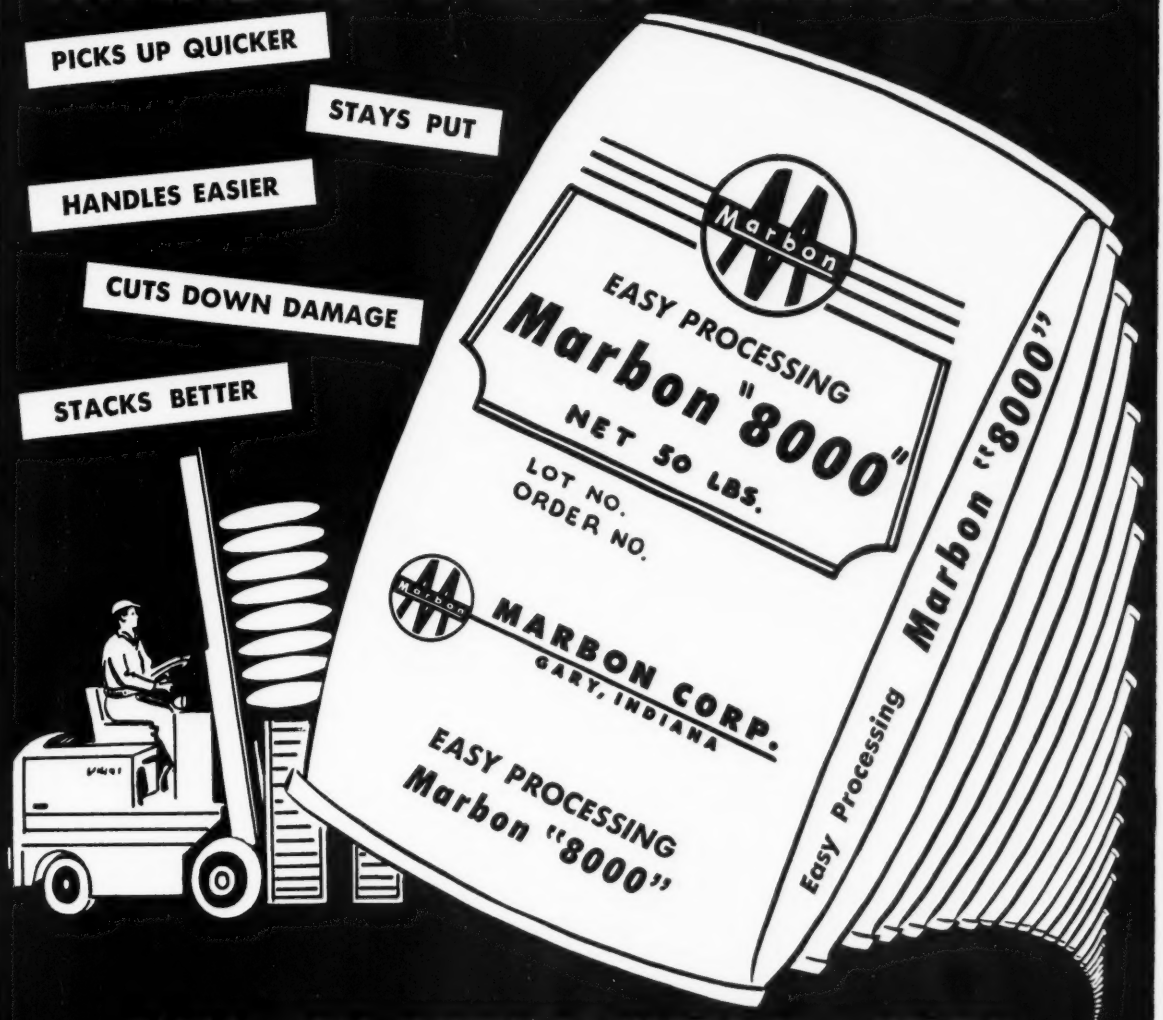
PICKS UP QUICKER

STAYS PUT

HANDLES EASIER

CUTS DOWN DAMAGE

STACKS BETTER



MARBON ADDS MODERN PACKAGING TO A MODERN PRODUCT FOR SAFER, FASTER, EASIER HANDLING!

Marbon "8000" scores again! This time in the advantage-plus crepe bag that actually cuts your handling time in half, and lends itself so perfectly for palletizing. You save time; you save money with Marbon's safer, faster, easier handling crepe bag.

MARBON CORP.

GARY, INDIANA

SUBSIDIARY OF BORG-WARNER

It BLENDS as it STRENGTHENS as it IMPROVES

MAIMIN STRIPOMATIK

ZOOMS
THROUGH ANY RUBBER

• When you plug in the MAIMIN STRIPOMATIK, you're boss of the world's most powerful, portable cutter. Guided by its sturdy gauge, the Stripomatik knife zooms through stubborn rubber straight as a die. Special rollers speed cutting without friction. Note water cooler. Mount two or more Maimin Stripomatiks within production line for automatic cutting and edge trimming. Save man hours and man energy with Maimin Stripomatiks now. Write H. Maimin Co., Inc., 575 Eighth Ave., New York 18.

A DEPENDABLE SOURCE OF SUPPLY FOR
Industrial Textiles
FOR THE
Rubber Industry

SUCH AS:

TIRE FABRICS
HOSE AND BELT DUCKS
YARNS • CHAFERS • THREADS
SHEETINGS • PLASTIC DUCKS
DIVERSIFIED COTTON FABRICS

Whatever your needs our Industrial Textile Specialists will be glad to discuss them with you. We solicit your inquiries.

THOMASTON Fabrics

Thomaston MILLS
THOMASTON, GEORGIA
NEW YORK OFFICE: 40 WORTH STREET

New Materials

Dry Blend Vinyl Resin—Marvinol VR-22

A NEW vinyl resin designed for dry blend feed of extruded products such as tubing and welting has been annouced by Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn. The resin, known as Marvinol VR-22, is a straight polyvinyl chloride resin of high molecular weight. It can be used in conventional dry blend equipment, open mills, or Banbury mixers, and is said rapidly to absorb plasticizer in heated mixers to give a dry, free-flowing mix of high uniformity.

Other properties reported for VR-22 include: no bridging or packing in the extrusion feed; fast drying time; and quick fusion. Extruded products which employ the material are said to be smooth, uniform, and free of fish eyes; be inherently heat stable; and have excellent resistance to heat deformation and compression under load.

Styrene Emulsion—Lustrex Latex 601-50

THE development of a 50% Lustrex styrene emulsion which is reportedly capable of being blended with GR-S 2002 styrene-butadiene emulsion has been announced by Monsanto Chemical Co., Springfield, Mass. The new product, Lustrex Latex 601-50, is also claimed to be suitable for use in post-plasticized systems in which it can be substituted on a solids basis for other latices containing less emulsified styrene. Developed for use in interior and exterior paint systems, the material is also expected to find application in other surface coating applications.

Duranyl Vinyl Stabilizers

A SERIES of four new stabilizers and anti-static agents for vinyl resins is being marketed by Alframine Corp., New York, N. Y., under the trade name of Duranyls. The function of the materials, which are incorporated into the resin in the milling operation, is to yield a plastic with the properties of increased toughness and decreased brittleness. Three of the four Duranyls are liquids at 20° C., the other is a soft wax that melts at 32° C.

Claimed to be non-toxic, non-inflammable, non-irritating, and non-corrosive, these materials are reported to be compatible with common vinyl plasticizers, colors, pigments, and fillers. Since the Duranyls act as dispersing agents, they will not agglomerate pigments and fillers; nor will they bleed or migrate to the surface of the vinyl. Duranyls are also recommended by the manufacturer for use with relatively inexpensive alkylated aromatic plasticizers since they reportedly inhibit the darkening of the vinyl, when exposed to sunlight, and counteract the repellent odor of the aromatics.

Plasticized Vinyl Acetate—Darex Everflex

A NEW "internally plasticized" vinyl acetate copolymer, said to eliminate the problems inherent in the compounding of polyvinyl acetate with chemical plasticizers, has been announced by Dewey & Almy Chemical Co., Cambridge, Mass. Named Darex Everflex, the new material is reported to replace completely polyvinyl acetate in regular formulations for adhesives and coatings. In addition to eliminating the need of further plasticizers, the copolymer does not lose flexibility because of aging, migration, or volatility of conventional plasticizers, it is further claimed.

"Electron Microscopy of Rubber Globules in *Hevea* Latex." Communication 196. M. Van den Tempel. Rubber-Stichting, Delft, Holland. 7 pages. The particle-size distribution of the globules, most of which are less than 0.2-micron in diameter, was studied, and the smaller-size particles were found to have considerable influence on the specific interface.

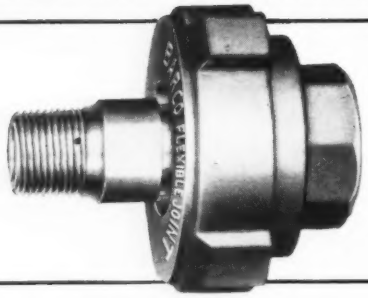
Milestones in rubber compounding

and many more to come....

The C. P. Hall Co.
CHEMICAL MANUFACTURERS

AKRON, OHIO • LOS ANGELES, CALIF. • CHICAGO, ILL. • NEWARK, N. J.

NEW! LEAKPROOF ROTARY SWIVEL JOINTS



- **PERFECT SEALING—HOT OR COLD!** Thanks to Barco's new #11 CT (chemically inert) seal.
- **NO BINDING, LOW TORQUE!** For improved operation of press platens, die heads, movable cylinders.
- **SELF-ALIGNING!** Simplifies and speeds up installation. Minimizes wear. Where needed, joints without side flexibility can be supplied.

Send for complete information today. The Barco line is complete with sizes and styles to meet every need. BARCO MANUFACTURING CO., 510J Hough St., Barrington, Illinois *(A Chicago Suburb)*

BARCO MFG. CO. In Canada: THE HOLDEN CO., LTD. Montreal, Canada

Quality Fabrics —FOR THE *Rubber* INDUSTRY

"The Preferred Source of Supply"

"SAN JUAN"® Cotton Duck

Single and Plied Yarn Chafer Fabrics
Hose and Belting Duck • Army Duck
Numbered Duck • Liner Fabrics
Enameling Ducks • Sport Shoe Fabrics
Wide Twills, Drills, Broken Twills
Selected Osnaburgs

Our technicians will gladly aid in creating industrial fabrics to your specification. We solicit your inquiries.

B. J. BARRY & CO.
INCORPORATED
62 WORTH STREET • NEW YORK 13
AKRON • BOSTON • LOS ANGELES • NEW ORLEANS
MILLS AT: Lincolnton, N. C. and Roanoke, Ala.

New Goods

All-Nylon Cord Tire

A NEW passenger-car tire constructed of all-nylon cord has been introduced by the Goodyear Tire & Rubber Co., Akron, O. Greater resiliency, lightness, strength, and cooler running are improvements claimed for the All-Nylon Cord Super-Cushion tire, due to the incorporated nylon.

Another feature of this new version of the company's original Super-Cushion model is its tread which, composed of a special rubber, is said to extend the wear life of the tire by 20%.

Goodyear's All-Nylon Cord Super-Cushion Tire

Flexible Anatomic Model

EVER since the first clay facsimile of the human body was examined by students of medicine 4,000 years ago, attempts have been made to develop a flexible, detailed anatomical model of a material such that its appearance and feel would be very similar to that of living tissue. Histoslide Co., Inc., Chicago, Ill., has developed a model which is claimed to have this property. Molded of Vinylite resin-based plastisols and designed from actual dissections, the new models are said to be resistant to accidental damage, unaffected by changes in temperature and humidity, and capable of being cleaned with a damp cloth. The various portions of the model including its removable organs are made to feel like their human counterpart by use of different plastisols based on Vinylite resins.

Anatomical Model Made of Vinylite Plastisols

The model of the head and torso of a six-foot man, completely assembled with its 26 removable organs, weighs 35 pounds and stands 44 inches high. Basic colors are pigmented into the plastisols to identify the various anatomical systems. The models are priced to be competitive with the more fragile plastic ones and are supplemented with independent specimens of the brain, heart, and other organs. Also available are flexible replicas of zoological and botanical specimens.

Small Truck Tire

UNITED STATES RUBBER CO., Rockefeller Center, New York 20, N. Y., is marketing a new low-cost truck tire, "The U. S. Tire," which is designed and manufactured particularly for small trucks used in rural areas. The tire is produced in sizes ranging from 6.00-16 for light pickup trucks to 10.00-20 for heavier commercial vehicles.

Construction features of the tire are said to include: safety bonded cord in which each individual cord in each ply is com-

HYDROCARBON

PANAREZ RESINS

3-210 An OUTSTANDING

Rubber Compounding Resin

PROPERTIES
Low Specific Gravity
Odorless Solid
Uniformity
Improves Processing
No Effect on Cure

FOR
Better Flex Life
Improved Abrasion Resistance
Light Colors
Oil Resistance
Excellent Electrical Characteristics

EXCELLENT COMPATIBILITY with
Natural Rubbers
General Purpose GRS
Cold Rubber GRS
Buna N Type Rubbers
Butyl Rubber

PAN AMERICAN CHEMICALS
PAN AMERICAN *Chemicals*
DIVISION
Pan American Refining Corp.
122 EAST 42ND STREET · NEW YORK 17, N. Y.

Rubber

Natural – Synthetic

S. J. PIKE & CO., INC.

30 CHURCH STREET, NEW YORK 7, N. Y.

CABLE ADDRESS "PIKESID, N.Y." TWX-NY 1-3214 TEL: WOrth 4-1776

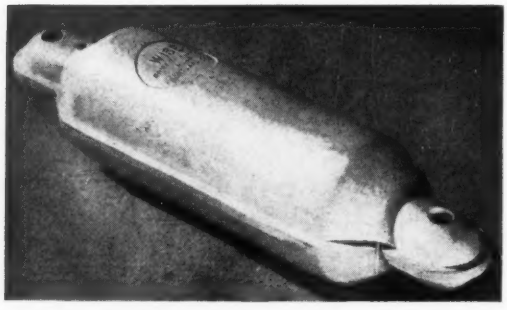
In Akron:
Tanney-Costello, Inc.
868 E. Tallmadge Ave.
Blackstone 4148

In Alhambra, Calif.:
Merit Western Co.
George Steinbach
717 So. Date Ave.
Cumberland 3-1400

PURE • UNDILUTED
IMS SILICONE
BOMB
The Ideal MOLD LUBE
FOR ALL TYPES OF CAVITIES
STEEL-cast, cut, hobbed
BERYLLIUM COPPER
BRASS • ALUMINUM
(Plated or Unplated)
It's SAFE — It's DRY!
It Fills the Pores
IMS
LICONE SP
MOLD RELEAS
long lasting!
non-marking!
PURE UNDILUTED SILICONE SPI
THE PERFECT MOLD LUBRICANT
Sample Can..... $ 2.00
Unbroken Dozen $18.00
(at $1.50 each)
Unbroken Gross $197.40
(at $1.37 each)
Further discounts on larger orders
Injection Molders Supply Co.
3514 LEE ROAD CLEVELAND 20, OHIO

D P R ®
Trade Mark
ORIGINATORS OF QUALITY
DEPOLYMERIZED RUBBERS
100% NATURAL
CRUDE RUBBER
IN FLOWABLE FORM
DPR
DEPENDABLE
DEPOLYMERIZED RUBBERS
AVAILABLE IN HIGH AND LOW
VISCOSITIES OF UNIFORM HIGH QUALITY
Technical Laboratory Information and
Samples Upon Your Request
"Since 1906"
DPR, INCORPORATED
A Subsidiary of H. V. HARDMAN CO.
571 CORTLANDT STREET
BELLEVILLE 9, N. J.

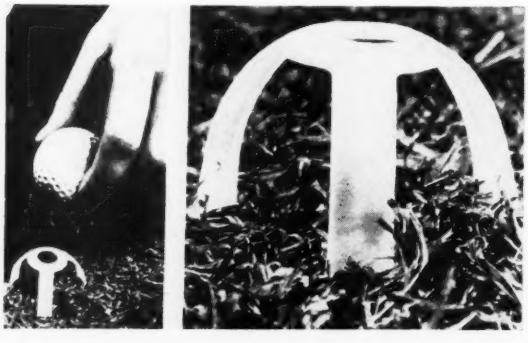
pletely rubber coated; two shock pads under the tread and shoulders; anchored beads of high tensile strength steel; and ventilated tread and shoulders. The tire has a wide, flat tread to give even wear, a rayon carcass for cool running and resistance to heat and bruises, a notched rib for good traction and steering, and a tough sidewall vent design for protection against snags and cuts.



Wise Pneumatic Marine Fender

Marine Fender

THE availability of a lightweight, durable marine fender, said to be unaffected by fresh or salt water, has been announced by Griffith Rubber Mills, Portland, Oreg. Fully pneumatic with thick walls of solid rubber, the Wise marine fender is claimed to provide complete protection for a boat hull against hard bumps while having a displacement ratio sufficient to act as an emergency life preserver. The double-eyed fenders, of a permanent white color, are manufactured in sizes of 3 by 12, 4 by 16, and 5 by 20 inches for use with runabout, yacht, and utility-type craft, respectively.



Polyethylene Golf Tee

Three-Legged Golf Tee

A NEW plastic golf tee which stands on three legs has been developed by Pee Gee Bee, Minneapolis, Minn. Manufactured in two colors of polyethylene, product of Bakelite Co., the tee is claimed to resist scuffing and destruction by golf club impacts. The ball rests in a hollow on top of the tripod-like tee, and its height may be adjusted by trimming and/or spreading or contracting the legs. The new product is claimed to eliminate the necessity of breaking through ground as is required when conventional tees are used.

Vinyl Garden Hose

A NEW, lightweight garden hose of vinyl plastic has been announced by Boston Woven Hose & Rubber Co., Cambridge, Mass. Known as Boston Kleerite, the transparent hose bears a five-year guarantee and is claimed to be the first low-price garden hose to feature the long wearing and non-kinking properties of more expensive hose. The product will be marketed in lengths of 25, 50, and 75 feet.

Manufacturers of CANARY LINERS

Mildew-proofing *and* Flame-proofing Cotton Fabrics as per Government Specifications. *Write or Wire for Samples and Quotations.*

EXPORT AGENT
Binney & Smith International, Inc.
41 E. 42nd St., New York 17, N. Y.

CANADIAN AGENT
Binney & Smith, Limited
33 Edward Street, Toronto 3, Ontario, Canada

J. J. WHITE Products Co.

7000 UNION AVENUE

CLEVELAND 5, OHIO

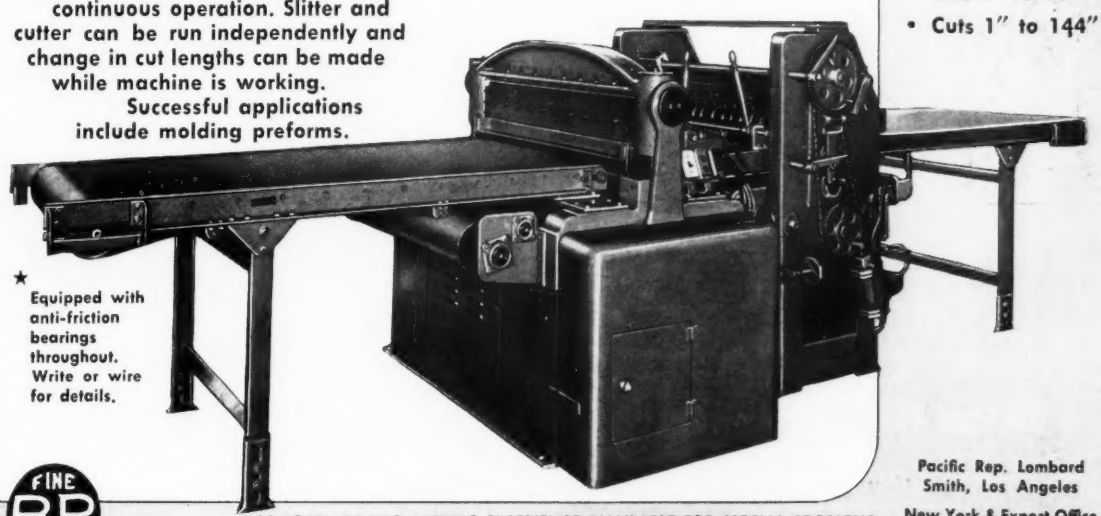
TIME SAVER...MONEY SAVER

CUTTER *Combination* SLITTER

FOR FAST PRODUCTION!

- Save time
- Save labor
- Save space
- More accuracy
- Big capacity
- Slits 1" to 48"
- Cuts 1" to 144"

Now — cut and slit cured and uncured rubber stock in one continuous operation. Slitter and cutter can be run independently and change in cut lengths can be made while machine is working. Successful applications include molding preforms.



★ Equipped with anti-friction bearings throughout. Write or wire for details.

FINE BR TOOLS

35 YEARS OF ENGINEERING EXPERIENCE AVAILABLE FOR SPECIAL PROBLEMS

BLACK ROCK MANUFACTURING COMPANY
175 OSBORNE ST., BRIDGEPORT, CONN.

Pacific Rep. Lombard Smith, Los Angeles

New York & Export Office
261 Broadway

Available *NOW*...

Latest American

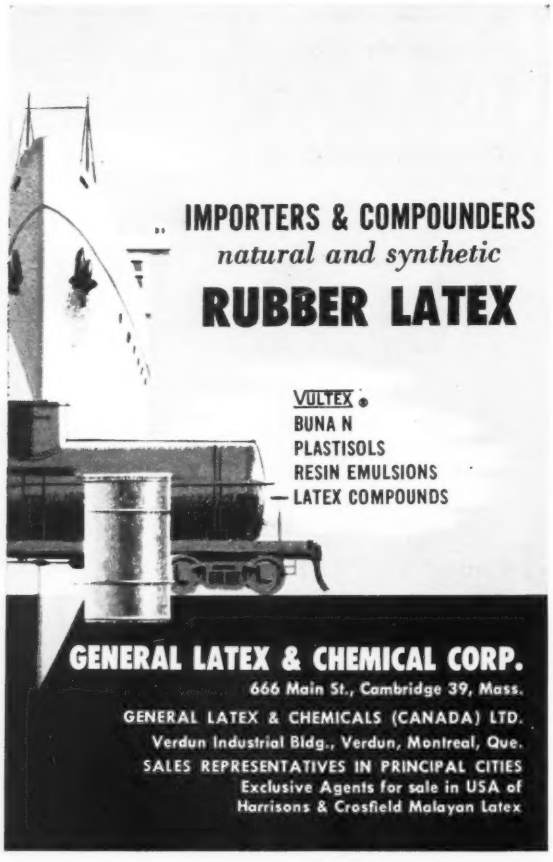
PRODUCTION TECHNIQUES!

- DAYTON RUBBER COMPANY'S low-cost International Assistance Plan is both unique and comprehensive. For more than twenty years Dayton has helped rubber manufacturers abroad with their research, production and personnel training problems.
- For very nominal cost, Dayton will assist you in the establishment of the latest formulae for processing natural rubber and all the new varieties of synthetic rubber . . . train your key personnel at any one of four modern plants . . . pass along to you up to date information concerning Tubeless Tires, Butyl Tubes, Rayon and Nylon Cords and Carbon Blacks . . . these services and many more.
- If you are now engaged in rubber manufacturing or plan to be, it will pay you to investigate Dayton Rubber Company's complete International Technical Assistance Plan.

INTERNATIONAL TECHNICAL ASSISTANCE DIVISION — I.T.A. — THE DAYTON RUBBER CO DAYTON, OHIO

For detailed information write-
International Technical Assistance Division
The Dayton Rubber Co.
Dayton, Ohio, U. S. A.
Cable Address: Thorobred

Since 1905, Manufacturers of Tires, Tubes, V-Belts for Automotive and Industrial power transmission and other specialized rubber products.



IMPORTERS & COMPOUNDERS
natural and synthetic
RUBBER LATEX

VULTEX •
BUNA N
PLASTISOLS
RESIN EMULSIONS
— LATEX COMPOUNDS

GENERAL LATEX & CHEMICAL CORP.
666 Main St., Cambridge 39, Mass.
GENERAL LATEX & CHEMICALS (CANADA) LTD.
Verdun Industrial Bldg., Verdun, Montreal, Que.
SALES REPRESENTATIVES IN PRINCIPAL CITIES
Exclusive Agents for sale in USA of
Harrisons & Crosfield Malayan Latex

EUROPE

GREAT BRITAIN

Competition Keen from German Plastics

German business methods were vigorously attacked in a speech by C. T. F. Mitchell, managing director of Wallington, Weston & Co., Ltd., Frome, manufacturer of plastic sheeting, at a recent dinner of its Foremen's Club. One of the chief difficulties met with by the plastics and rubber industries in the past year or so, he said, was the very serious and ever-increasing competition from Germany made possible by a clever way of subsidizing which took the form of tax rebates for exports. These rebates amounted to 10-12½% in the case of plastic sheeting, a percentage very much more than the net profit his company could make on such articles. The Board of Trade and the Federation of British Industries have been called upon in the matter, but so far these bodies do not seem to have been able to accomplish anything. Consequently Wallington Weston has decided "to fight German competition tooth and nail to meet their prices, even if it does not show any profit whatsoever to ourselves," Mr. Mitchell declared, adding that most manufacturers in the same lines as his firm have decided on similiar tactics.

Production of plastics in the United Kingdom, it may be pointed out, has developed considerably in the last 14 years, and in 1952 was six times greater than in 1938. Exports of plastic materials rose in that period from £400,000 to £13,600,000. The 1952 figure, however, represents a significant decline from that of 1951, when the total came to £16,250,000.

IRI Foundation Lecture

The 1953 IRI Foundation Lecture, "The Economics of Technical Development," was presented in London on May 25 by S. A. Brazier, technical manager of the general rubber goods division and local director of Dunlop Rubber Co., Ltd., at Manchester. He discussed briefly trends of development in industrial rubber goods basic to the industry's well-being now and in the immediate future. Among the most important were mentioned means of handling bulk material, such as flame-resistant conveyor belts for underground use in mines, and high-tensile belts for very long hauls of loads. To illustrate the potential market of the former type of belts, Brazier mentioned that the National Coal Board uses 6,500,000 yards of conveyor belting of all kinds, of which 5,800,000 yards are of rubber and fabric. Of the latter, 1,100,000 yards are used on coal faces, and the remaining 4,700,000 on roadways.

V-belts for power-transmission; small bore hose, reinforced with high tensile steel wire; general mechanicals, including various types of shock and vibration insulators, designed to protect sensitive instruments or to eliminate noise and vibration of heavy machines; resin soling; foamed latex; all were treated.

Mr. Brazier concluded by emphasizing that product development by research must frequently replace price competition in international markets and to this end, a strong foundation of research and development is necessary. He showed that surveys revealed that in the United States general average research expenditure for all industries represented about 2% of sales value; while the percentage allotted for the purpose by British industries was far below the 1-2% on turnover recommended by a conference held not long ago by the Federation of British Industries.

RGA General Meeting

At the regular general meeting of the Rubber Growers' Association (Inc.), May 1, in London, P. B. L. Coghlan was elected chairman, and K. M. G. Anderson, vice chairman, for the ensuing year. Mr. Coghlan is a director of Eastern Industries, Ltd., and Mr. Anderson, of Guthrie & Co., Ltd. Both gentlemen are also directors or chairmen of a number of rubber plantations companies and are members of the RGA council.

The retiring chairman, Sir Sydney Palmer, in his speech discussed the apparent improvement in conditions in Malaya, but repeated the warning of General Templer that the improvement might be due to a change in Communist policy from active terrorism to peaceful infiltration. Sir Sydney took the occasion to stress the need of free competition with synthetic rubber and of

THE SEAL OF DEPENDABILITY

Our products are engineered to fill every need in natural and synthetic rubber compounding wherever the use of vulcanized oil is indicated.

We point with pride not only to a complete line of solid Brown, White, "Neophax" and "Amberex" grades, but also to our aqueous dispersions and hydrocarbon solutions of "Factice" for use in their appropriate compounds.

Continuing research and development in our laboratory and rigid production control has made us the leader in this field. The services of our laboratory are at your disposal in solving your compounding problems.

Oldest and Largest Manufacturers of "Factice" Brand Vulcanized Oil Since 1900

Reg. U.S. Pat. Off.

THE STAMFORD RUBBER SUPPLY COMPANY
Stamford, Conn.

MOLDS

any capacity to
60 inches by 30 feet long

ACE MACHINE AND MOULD COMPANY, INC.
17 COLUMBUS AVENUE GARFIELD, N. J.

Designers and manufacturers of molds for rubber goods since 1925

We specialize in straight and varying cross-section molds for production of sponge rubber weatherstripping for aircraft and automotive industries.

Molds for use in McNeil and Glader presses.

We also manufacture molds for V-belts, belting, rails, etc.

Magnesia

for use with natural and synthetic

Rubber

for all compounding purposes

Genmag Technical—
with neoprene, for scorch resistance.

Extra Light Calcined Magnesia—
for excellent scorch resistance and high tensile, fast cures.

Light Calcined Magnesia No. 101—
low in price; high in effectiveness.

Heavy Calcined Magnesia—
low manganese types in a variety of finenesses.

Magnesia Carbonate—
light, fine and pure.

MANUFACTURERS
IMPORTERS
DISTRIBUTORS

SEND FOR SAMPLES AND QUOTATIONS

General Magnesite & Magnesia Company

SPECIALISTS IN MAGNESIA

100 Gravers Road Plymouth Meeting, Pa.

The term

"COTTON FLOCKS"

does not mean cotton fiber alone

EXPERIENCE

over twenty years catering to rubber manufacturers

CAPACITY

for large production and quick delivery

CONFIDENCE

of the entire rubber industry

KNOWLEDGE

of the industry's needs

QUALITY

acknowledged superior by all users are important and valuable considerations to the consumer.

Write to the country's leading makers for samples and prices.

CLAREMONT WASTE MFG. CO.

CLAREMONT N. H.

The Country's Leading Makers

American cooperation in maintaining satisfactory rubber prices to thwart Communism, quoting Ceylon's deal with Red China as an example of the result of faulty American rubber policy. The governments in the rubber producing countries he criticized for having imposed "penal taxes" on the industry and thus hampering its prosperity.

In Indonesia, he went on, members of the RGA faced, besides taxation problems, the uncertainty of the transfer of profits and the security of future land titles and also difficulties and delays in obtaining entry permits for essential staff. While recognizing that Indonesians had a prior claim to employment in the industries of their own country, the speaker hoped that until there were enough qualified Indonesians for available jobs, the Indonesian Government would adopt a more reasonable and realistic attitude over the entry of foreign staff, so as to maintain the efficiency of the industry so vital to the national economy.

Rubber Trade Notes

Dunlop Rubber Co., Ltd., has arranged with Henry Simon (Holdings), Ltd., to acquire its interests in the retreading concern, Tyresoles, Ltd. The latter will continue to operate under its own management as a separate member company of the Dunlop group. The arrangement apparently does not affect Tyresoles (Overseas), Ltd., which will reportedly continue as at present, a separately owned subsidiary of Henry Simon.

At a meeting of the Council of the Institution of the Rubber Industry it was decided, among other matters, that the change of name of the Institution should be deferred and reconsidered at a later date, because of lack of enthusiasm on the part of a large section of the members. It was also agreed that the Third Rubber Technology Conference should be held at Church House, Westminster, from June 22 to 25, 1954.

Expansion of the reinforced plastics industry in Scotland, and active encouragement of new chemical industries at Grangemouth, the site of a growing petroleum refining undertaking, are on the program of 1953 activities of the Scottish Council (Development and Industry).

This spring Metalastik made an arrangement with the Pirelli company of Milan, Italy, providing for an exchange of patents on the manufacture of rubber-to-metal bonded products and for technical and commercial cooperation in connection with these manufactures. Early in January, Metalastik had announced a similar arrangement with a French concern.

NETHERLANDS

Rubber Stichting and its various branches have participated in a number of activities in recent months.

The Belgian Section arranged an exposition on "Rubber and Its Applications," together with an International Rubber Conference, in Brussels early in the spring. A similar exhibition and conference were organized by the Swiss Section, for April 24-May 6, at Zurich.

Rubber Stichting cooperated in the setting-up of stands for Indonesia at the annual fair at Utrecht and later also at the Milan Fair.

The exhibition in Copenhagen, Denmark, in connection with the recent meeting of The Rubber Study Group, was held under the auspices of the Scandinavian Section of the International Rubber Bureau, the Stockholm office of Rubber Stichting.

On June 8 experts from Indonesia, Malaya, France, England, and the Netherlands met at the Rubber Stichting building, Delft, to discuss progress of the technical classification of rubber.

The latest bulletin from the Stichting announces an "International Symposium on Progress in Rubber Technology" and an International Inventors' Day, scheduled for Delft, October 7-8. The following papers will be offered:

"Reinforcement by Resins," G. Giger, Institut Français du Caoutchouc, Paris, France.

"Mechanism of the Reinforcement of Rubber Compounds," F. Endter, Degussa, A.G., West Germany.

"Structure and Properties of Rubber Vulcanizates with Inorganic Fillers." H. Westlinning, Degussa.

(The subject of another German speaker, W. Scheele, has not yet been fixed.)

"Carbon Black Masterbatches from *Hevea* Latex." H. C. J. de Decker (for INIRO, Indonesia).

Members of the Rubber Stichting will present seven papers:

"Developments of Flooring Materials" and "New Developments in Latex Technology," P. Braber.

"Rubber Derivatives, Production and Properties," H. C. J. de Decker.

"Technological Considerations in the Manufacture of Latex Foam Rubber," G. W. van Raamsdonk.
"The Interpretation of Mechanical Measurements by Means of the Theory of Relaxation," G. Salomon.
"The Crystallization of Rubber and its Derivatives," G. Schuur.
"Latex Fillers," A. J. de Vries.
"Reinforcement by Black Pigments," D. E. M. Dannenberg, Godfrey L. Cabot, Inc., Boston, Mass., U. S. A.

SWEDEN

A process has been developed in Sweden for making rubber from domestic products, primarily cellulose alcohol, of which 6.6 pounds yields 2.2 pounds of rubber, it is claimed. Lignin is used as a filler. It is admitted that to be fully usable the new alcohol rubber, which at present is more expensive than the American synthetic product, must be mixed with natural rubber.

FAR EAST

MALAYA

Losing Japan as a Rubber Buyer

A member of the Malayan Rubber Export Registration Board recently went to Japan to investigate a complaint made to the Board by the Japanese Rubber Trade Association that an excessive amount of talc had been used in a recent shipment of Malayan rubber. This is the first time that the Board has been called upon to send a member abroad in response to a claim, since it was set up not long ago to insure that shippers adhered to the terms of their foreign contracts.

An earlier complaint from Japan claimed that as much as three pounds of talc had been found in a bale of Malayan rubber. Similar complaints had also been received from Genoa and Los Angeles. Consequently in April, the M.R.E.R.B. decided to start a campaign against the practice indulged in by some exporters of heavily dusting with talc between sheets of rubber.

The fact that Japan has to some extent been switching purchases of crude rubber from Malaya to Indonesia has been interpreted by some as the result of excessive use of talc. But reports from Tokyo indicate that the trend away from Malaya

SEE PAGE 560

Now . . . Measure Latex Flow without Seal Pots!

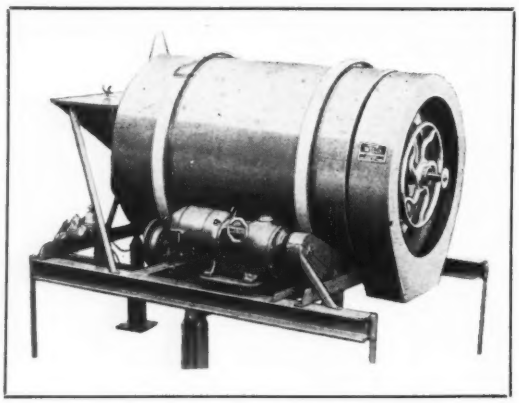
You get rid of seal pot difficulties, once and for all, when you measure the flow of latex or similarly troublesome fluids with the Foxboro d/p Cell! By installing this unique differential pressure transmitter, one leading rubber manufacturer realized an *83% reduction* in instrument cleaning and maintenance costs. This saving, alone, will repay the cost of his d/p Cell installation within the first year! In addition, production losses due to downtime for instrument maintenance are practically eliminated.

The reason why the d/p Cell needs no seal pots is the essentially-zero displacement of its measuring element. Other features: uses no mercury; compact and easy to install; Type 316 S.S. construction. Thousands in use on all types of fluids!

Write for detailed Bulletin 420 describing the revolutionary d/p Cell! The Foxboro Company, 628 Neponset Ave., Foxboro, Mass., U.S.A.

FOXBORO
Reg. U.S. Pat. Off.

WILLS "SUB-ZERO"
ROTARY TUMBLERS



AMAZING RESULTS PRODUCED
BY THE NEW METHOD USING—
LIQUID CO_2
DEFLASHING RESULTS PROVE STARTLING.
MODELS SOON AVAILABLE TO USE EITHER
SOLID OR LIQUID CARBON DIOXIDE.
FERRY MACHINE COMPANY
WILLS RUBBER TRIMMING DIVISION
KENT, OHIO, U. S. A.
(Export Sales Through Binney & Smith, International)

RUBBER
CRUDE AND SYNTHETIC
Sole Distributors
DUNLOP CENTRIFUGED LATEX
NORTH · SOUTH · CENTRAL AMERICA
Sole U.S. Distributor of
SYNTHETIC LATICES
for
POLYMER CORPORATION, LTD.
Sarnia, Ontario, Canada

CHARLES T. WILSON CO., INC.
120 WALL STREET, NEW YORK 5, N. Y.
AKRON BOSTON LOS ANGELES TORONTO
MEXICAN SUBSIDIARY COMPANY:
COMERCIAL TROPICAL, S.A., MEXICO CITY

has been caused by the financial inducements offered by Indonesia.

Japan formerly imported 60% of her crude rubber needs from Malaya and about 40% from Indonesia; the position has now been reversed. In the first quarter of 1953, Malaya supplied 9,759 tons of rubber to Japan out of total imports of crude for the period of 20,059 tons; Indonesia sent 10,215 tons, and Siam the remaining 85 tons.

Incidentally, the Japanese trade with Indonesia is not without its problems either; a recent report states that Japanese importers charge Indonesian packers with falsifying the weight of rubber shipments to Japan.

Wage Settlement

After eight months of discussion the Malayan Planting Industries Employers' Association and the Pan-Malayan Rubber Workers' Negotiating Committee finally agreed on the entire wage scale, based on rubber prices from 60 to 90 cents (Straits currency) per pound, substantially as awarded by the Whitton Arbitration Board.

The wage scale for the third quarter of 1953 will entail an average reduction in the daily wage of 15 cents for about 320,000 workers. Contract tappers will get $2.80, instead of $3.00 a day, and checkroll tappers, $2.50 instead of $2.65. There is to be no change in the wages of field workers, who have been receiving $2.10 daily.

It is understood that there may be some further changes if the price of rubber during a quarter averages 65 cents a pound. The average price for the April-June quarter worked out at 69.3 cents a pound.

Early in July, rubber producers and workers were scheduled to meet to discuss a government "harmony" plan, involving the establishment of joint industrial councils at three levels—estate, state, and federal.

Rubber Industry Notes

Writing for the Malayan rubber producer, Sir Sydney Palmer has been prophesying bleak prospects for the current year, but a more promising future. By 1960, he thinks, world consumption of synthetic and natural rubber together may equal present production of both. But meantime the price of natural rubber may be so low as to make it impossible for many producers to rejuvenate their estates and to benefit from modern high-yielding material. He added that if this state of affairs materialized, it would be largely due to the policy of the United States Government of selling its synthetic rubber at a lower price than could be achieved by private industry.

According to preliminary figures, rubber shipments from Malaya in the first half of 1953 came to 414,258 tons, against 455,664 tons in the first half of 1952. Shipments in June, 1953, at 60,181 tons, were the lowest for any month since October, 1946. No rubber went to China or Russia during the period under discussion.

The Malayan Governments are reportedly studying the effect of lifting the ban on shipments of rubber to Communist China.

Data have been published showing that in March, 1953, ten factories in the Federation produced 530,000 pairs of rubber-soled canvas shoes, 89,000 pairs of shoes mainly of rubber, and 118,000 pairs wholly of rubber. Other factories produced rubber flooring (104,994 pounds), belting (7,058 feet), tubing and hose (27,345 pounds), tires (12,562 units), tubes (52,780 units), and rubber compound (126,283 pounds).

So far four states in Malaya, including Singapore, have laid experimental strips of bitumen-rubber powder roads, and three more are said to be planning to try them. Kuala Lumpur has three experimental sections of rubber road of this type. It is hoped that by the middle of next year every state in Malaya will have put down at least one such trial strip.

INDONESIA

After 27 years of activity in behalf of rubber growing, J. S. Vollema, until recently Director of Agriculture for West Java and South and West Sumatra, and head of the West Java Experiment Station, has asked the General Association of Experiment Stations to be retired. Vollema came to Java from Holland in 1924 and in 1926 joined the Rubber Experiment Station at Buitenzorg as agriculturist, at first

investigating soil problems, but later chiefly questions pertaining to planting material, tapping, replanting, selection, and thinning out of rubber. During the Japanese occupation he was interned for three years, but though his health had suffered from this experience, immediately after his release, he joined the rehabilitation team sent to Buitenzorg, anxious to protect his experiment station, its valuable contents, and the experimental gardens. Vollema has written more than 70 articles on his investigations.

In Djakarta it has been reported that informal talks between Soviet Russia and Indonesian officials have been held regarding barter trade between the two countries. Some agreement on the basis for such trade seems to have been reached.

INDIA

According to the Indian Rubber Board *Bulletin*,[1] India produced 19,863 tons of rubber in 1952, against 17,148 tons in 1951 and 15,599 tons in 1950. Imports of crude rubber in the same years were 3,851, 6,921, and 1,082 tons respectively; while consumption amounted to 21,061, 22,427, and 17,735 tons, respectively.

The area under rubber at the end of 1952 totaled 172,786 acres, of which 138,186.21 acres were planted with ordinary seedlings, 24,840.95 with buddings, and 9,758.84 with clonal seedlings. Estates with a combined area of 103,182.2 acres accounted for almost 90% of the high-yielding rubber.

To encourage planting of high-yielding material, especially on smallholdings which, though representing 40% of the total acreage under rubber, had only 10% of the improved plantings—the Indian Rubber Board has been supplying clonal seed from local sources to rubber growers at special rates since 1951. Individual purchasers may buy up to 2,000 seeds at two-thirds the usual price; for additional quantities the regular price prevails.

[1]Vol. II, Nos. 3 and 4 (1952).

AUSTRALIA

Imperial Chemical Industries of Australia and New Zealand, Ltd., is to increase its capital from £A.15,000,000 to £A.25,000,000. In the year ended September 30, 1952, net profits of almost £A.1,000,000 were made, higher than for any previous year, except the record year 1951. Sales totaled more than £25,000,000.

British Insulated Callender's Cables has formed a new subsidiary in Victoria, capitalized at £A.400,000, to be known as British Insulated Callender's Cables (Australia) Pty., Ltd. The new company will take over existing branches and will coordinate the activities of the many agencies throughout Australia in order to produce a stronger sales and technical service organization and to coordinate the trading interests of the parent concern. The Australian company will also collaborate with the English concern in construction and installation work. The first chairman of the board is to be Sir T. Malcolm Ritchie.

UNION OF SOUTH AFRICA

The continued drop in the price of raw rubber has apparently caught most South African rubber dealers with large stocks on their hands, and to this situation is attributed the recent decision of the South African Tire Manufacturers' Conference to reduce the price of tires and tubes. The cuts are 6% in the case of truck and tractor tires and 8½% for passenger-car, motorcycle, horse-drawn vehicle, and wheelbarrow tires; tractor rear tubes will cost 10% less; all other tubes, 7½% less. A series of increases in tire prices had started toward the end of 1950 which totaled about 56% in the succeeding 13 months, it is said.

The range of rubber manufactures being produced here is constantly being widened, and demand is apparently meeting supply. A few years ago the Dunlop plant at Durban began

(*Continued on page 689*)

Resin emulsions for natural, GRS, Neoprene and Buna N latices offer many new properties in addition to the standard requirement of increased tack.

Case History #235

Customer needed improved tensiles and water resistance from a GRS latex compound — at a low cost. Many experiments with clays and other fillers failed to meet the requirements — but ARCCO resin emulsion gave the GRS latex the added qualities needed.

You too can get better tensiles from GRS latices and lower emulsion costs with GRS as well as with other latices. These and many other applications are possible through the use of ARCCO resin emulsions.

What is your problem? Whether it is standard or unique we would be glad to have the opportunity of helping you reach a satisfactory solution. Write today.

ARCC

AMERICAN RESINOUS CHEMICALS CORPORATION

RESIN EMULSIONS, SOLUTIONS AND HOT MELTS FOR ADHESIVE BASES, BINDERS, COATINGS, SIZES AND SATURANTS

GENERAL OFFICES: *103 FOSTER STREET, PEABODY, MASSACHUSETTS*

IN CANADA: American Resinous Chemicals of Canada, Ltd., Toronto, Canada

wonderfully

compatible

The MEREZ Series (A-B-C-D) of new zinc resinates is so compatible with almost all resins, drying oils and plasticizers that it offers a wide range of formulations and products of interest to rubber compounding formulators. Further, we can tailor-make zinc resinates for specified properties not possessed by any standard products.

- Limed Rosins
- Rosin Oils
- Solvents
- Pine Tars
- Pine Tar Oil
- Pine Oil
- Burgundy Pitch
- Tackifiers
- Dipentene

For samples and prices of these Glidden Company Naval Stores Division products write:

E. W. COLLEDGE

G. S. A., Inc. P. O. Box 389 Jacksonville 1, Fla.

52 Vanderbilt Avenue
New York 17, N. Y.

25 E. Jackson Blvd.
Chicago 4, Ill.

2775 South Moreland Blvd.
At Shaker Square
Cleveland 20, Ohio

503 Market Street
San Francisco 5, Calif.

KAMLOK

COUPLING ASSEMBLIES

The Fastest, Surest Coupling Known

KAMLOK Couplings combine *speed, perfect performance, durability*—three features that are indispensable. *Fastest!* Perfectly tight, safe connection *in seconds*, by sliding coupler over adaptor, and pressing cam levers. KAMLOKS couple and uncouple *instantly*, regardless of "hookup." *Efficient!* No wasted *time—effort*, achieving leakproof-tight connection that guarantees consistently safe operation at peak efficiency. *Long-lasting!* Made of hard wear-resistant bronze to 3". 4" size of OPALUMIN, as strong as bronze, only ⅓ the weight. KAMLOKS add extra life to hose.

Write for Bulletin F-3

OPW CORPORATION

VALVES, FITTINGS, ASSEMBLIES
for handling hazardous liquids

2735 COLERAIN AVE. • CINCINNATI 25, OHIO

Editor's Book Table

BOOK REVIEWS

"Handbook of Chemistry and Physics." Thirty-fourth Edition. Charles D. Hodgman, Editor-in-Chief. Chemical Rubber Publishing Co., 2310 Superior Ave. N.E., Cleveland, O. Cloth, 4½ by 7¼ inches, 2,970 pages. Price, $8.50.

This new edition of the Handbook retains the format and general appearance of the preceding issues and divides the contents into five sections, as follows: mathematical tables; properties and physical constants; general chemical tables; physics data; and quantities and units. In addition to numerous changes throughout the data, two major revisions involving the addition of 274 pages have been made by resetting the tables on physical constants of inorganic compounds, and physical constants of industrial organic compounds. The table on physical properties of natural and synthetic rubber stocks has been completely revised and brought up to date, and considerable data have been added to the table of constants of oils, fats, and waxes.

"Radioisotopes in Industry." Edited by John R. Bradford. Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y. Cloth, 6 by 9 inches, 316 pages. Price, $8.

This book is based on a series of lectures presented at Case Institute of Technology, in cooperation with the Atomic Energy Commission, in April, 1951. The original material has been amended and expanded to include the most recent developments in the field, and the result is an up-to-date compilation of available information on the important industrial uses of radioactive isotopes. Both source and tracer types of applications are described; the former is exemplified by thickness, liquid level, and liquid flow gages, and the latter by studies of reaction mechanisms, analytical procedures, and studies of physical and chemical transfers.

The 14 articles comprising the book follow: "Radioisotopes: A New Industry," T. K. Glennan; "Radioisotopes for Industry," P. C. Aebersold; "Fundamentals of Radiochemistry," Mr. Bradford; "Radiation Protection," Otto Glasser; "Radioisotopes in Physical and Chemical Research," G. D. Calkins; "Applications of Radioisotope Techniques," Charles Rosenblum; "Radiochemical Laboratories," T. B. Lanahan; "Design of Laboratories for Safe Use of Radioisotopes," D. R. Ward; "Production and Separation of Radioisotopes," A. F. Rupp; "Tracer Experiments," Rex Fluharty; "Instrumentation in the Radiochemical Laboratory," V. L. Parsegian; "Decontamination and the Disposal of Radioactive Wastes," C. C. Ruchhoft; "Industrial Uses of Radioactive Fission Products," P. M. Cook, W. E. Hosken, and P. J. Lovewell; and "Distribution of Radioisotopes by the Atomic Energy Commission," S. A. Lough. Appendices on useful radioactive isotopes, and a subject index complete the book.

"Handbook of Material Trade Names." 1953 Edition. O. T. Zimmerman and Irvin Lavine. Published by Industrial Research Service, Masonic Bldg., Dover, N. H. Cloth, 7¼ by 10¼ inches, 810 pages. Price: $20 domestic; $22.50 foreign.

Rather than being a new edition of the original 1946 handbook, this volume is a completely new book since it has been entirely rewritten, greatly expanded, and improved by the addition of new features. The title is actually misleading, since the book covers material trade names, registered and unregistered trade marks, common names, and generic terms, each identified by a distinguishing symbol. The text is divided into three sections. The first is an alphabetical listing of more than 15,000 materials; each entry gives the properties, important uses, and manufacturer of the product. The second section is a cross-indexed classification of the materials according to their compositions and uses. The concluding section offers the names and the addresses of the more than 1,500 firms mentioned in the book, together with a list of each company's products.

NEW PUBLICATIONS

"St. Joe Unit-Loads for Truck and Carload Shipments of Zinc Oxide." St. Joseph Lead Co., New York, N. Y. 6 pages. Loading and unloading methods developed by the company are described and illustrated.

"Silastic Newsletter." Vol. 1, No. 2, May-June, 1953. Dow Corning Corp., Midland, Mich. 4 pages. This publication describes the uses of Silastic in coating glass cloth, in coating organic fabrics, and in covering rollers. Also contained are a Silastic slide rule which gives average physical and electrical properties of common Silastic stocks, data on the curing schedule *vs.* properties of Silastic 50 and 80, and a list of potential customers for the material.

"Sharples Rubber Chemicals." Catalog 53-1. Sharples Chemicals, Inc., 123 S. Broad St., Philadelphia 9, Pa. 32 pages. The grades, properties, uses, and identification system of the chemicals manufactured by the company are given. In addition, the following features are contained: the compounding characteristics of each of the chemicals listed; information on heat history of accelerator compounding, including a large section on the vulcanization time; time-temperature relations for scorch and cure; and a nomograph for temperature coefficient of vulcanization.

"Thiokol Liquid Polymer-Epoxy Resin Combinations." Thiokol Corp., 780 N. Clinton Ave., Trenton 7, N. J. 9 pages. Preliminary formulae, physical characteristics, and applications are shown for the combinations of the company's liquid polymers with three epoxy resins manufactured by other firms. In addition, the history of these combinations and two of the more important uses are described.

"Crystal Urea (Carbamide)." Allied Chemical & Dye Corp., New York, N. Y. 8 pages. The chemical and physical properties, uses, and future possible applications of this chemical are listed in this booklet.

"Monomer-Polymer Price List." Catalog A-5. Monomer-Polymer, Leominster, Mass. 12 pages. Besides the prices of more than 300 specialty research monomers and polymers, this booklet contains some of the physical specifications of the products and a listing of catalysts and accelerators, monomers for polyelectrolytes, substituted ethylenimines, and cross-linking agents produced by the company.

"Aldehydes." Booklet F-5278. Carbide & Carbon Chemicals Co., New York, N. Y. 38 pages. The 14 aldehydes sold by the company in commercial quantities are discussed in detail; information on other aldehydes which are available in research quantities are also included.

"The New Goodyear Rubber, Chemigum SL." R. P. Dinsmore, Goodyear Tire & Rubber Co., Akron, O. 20 pages. In this reprint of a speech given by Dr. Dinsmore before the Washington Rubber Group, the chemistry and properties of the new product are described and illustrated.

"Hycar Latex Newsletter." Issue No. 4. B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, O. 4 pages. Subjects covered in this letter include the properties of Hycar latices; grease-and-waterproof paper coatings; and alpha protein and casein in Hycar clay coatings for paper.

"Hycar Technical Newsletter." Vol. 2, No. 7. 8 pages. Data on curative systems for Hycar 4021, and a recipe and test data on Chrysler Specification MS-BZ75 are presented.

"Specifications for Government Synthetic Rubbers, Revised Edition—October 1, 1952." Reconstruction Finance Corp., Office of Synthetic Rubber, Washington 25, D. C. 97 pages. Included in this catalog are specifications for the rubbers, sampling test methods, chemical test methods for solid polymers, physical test methods for solid polymers, and latex test methods. The effective date of each of the individual specifications and tests are given in order to facilitate revisions and additions. Although the title date is October 1, 1952, distribution of the publication was not made until February, 1953.

Publications of Phillips Chemical Co., 318 Water St., Akron 8, O.

"Reinforcement Characteristics of Philblack I in Cold Rubber." Philblack Bulletin No. 22. 3 pages. These loose-leaf sheets give physical test data on this Intermediate SAF carbon black and compare it with other ISAF blacks.

"Rubber Grade Carbon Blacks." 1 page. This chart contains a list of the distributors and producers of carbon blacks, together with the type and the trade name of the blacks handled by each.

NEW PATAPAR
Releasing Parchments

Four new releasing types of Patapar Vegetable Parchment have characteristics which make them ideal as protective backing or wrapping materials for tacky substances. Their dense, fibre-free surfaces release easily from a wide variety of uncured natural or synthetic rubbers. They are used as separator sheets for uncured rubber, rubber tape, and as backing for pressure sensitive surfaces.

Important qualities

Although each of the four new releasing types of Patapar differ in properties and appearance, each type offers these advantages:

- **Low cost**
- **Excellent release from many tacky surfaces**
- **Dense, fibre-free surfaces**
- **Releasing qualities remain constant as time passes**
- **High resistance against penetration or migration by rubber softners and oils**

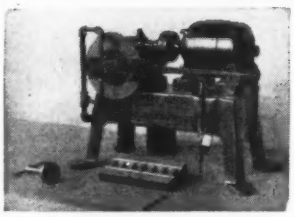
Send for samples

We'll gladly send you complete information and samples of each of the four types of Patapar Releasing Parchments. Just write us.

Paterson Parchment Paper Company
Bristol, Pennsylvania
West Coast Plant:
340 Bryant Street, San Francisco 7
Sales Offices: New York, Chicago
Headquarters for Vegetable Parchment Since 1885

Patapar®
Vegetable Parchment
HI-WET-STRENGTH · GREASE-RESISTING

TESTED IS TRUSTED



DUPONT ABRADER

One of the many *Scott Testers for "World-Standard" testing of rubber, textiles, plastics, paper, wire, plywood, up to 1 ton tensile.

SCOTT TESTERS

SCOTT TESTERS, INC.

90 Blackstone St., Providence, R. I.

*Trademark

THE ALUMINUM FLAKE COMPANY

AKRON 14, OHIO

Manufacturers of

ALUMINUM FLAKE

A COLLOIDAL HYDRATED ALUMINUM SILICATE

REINFORCING AGENT for

SYNTHETIC and NATURAL RUBBER

New England Agents — Warehouse Stocks

BERLOW AND SCHLOSSER CO.

401 INDUSTRIAL TRUST BUILDING

PROVIDENCE 3, RHODE ISLAND

MOLDS

WE SPECIALIZE IN MOLDS FOR

Heels, Soles, Slabs, Mats, Tiling and Mechanical Goods

MANUFACTURED FROM SELECTED HIGH GRADE STEEL BY TRAINED CRAFTSMEN, INSURING ACCURACY AND FINISH TO YOUR SPECIFICATIONS. PROMPT SERVICE.

LEVI C. WADE CO.

79 BENNETT ST. — LYNN, MASS.

FINELY PULVERIZED, BRILLIANT

COLORS

FOR RUBBER-VINYLS

Western Representative: FRED L. BROOKE CO., 3340 North Halsted Street, Chicago 13, Ill.

Ohio Representative: PALMER SUPPLIES CO., 8905 Lake Ave., Cleveland; 800 Broadway, Cincinnati

Pacific Coast: ERWIN GERHARD 625 Market St., San Francisco 5, Calif.

BROOKLYN COLOR WORKS INC.,

MORGAN & NORMAN AVES., BROOKLYN 22, N.Y.

"1953 Tire Inflation Chart." The Rubber Manufacturers Association, Inc., New York, N. Y. 17 by 22 inches. The correct tire pressures for all makes of 1950, 1951, 1952, and 1953 passenger cars appear on this chart.

"Dunlop Through the Reigns." Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., Canada. 8 pages. This booklet presents a historical study of the growth of Dunlop in Canada through the reigns of the rulers of Great Britain from 1888 to the present.

"Handbook of Accident Prevention for Business and Industry." National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. 94 pages. Designed primarily for the small businessman, this book shows how to set up and maintain a safety program without employing a safety specialist.

"Chemical Resistance of Various Types of Rubber." Sales Message 53-2. Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, O. 4 pages. This publication is a résumé of the chemical resistance of various types of rubber to commercial organic chemicals, organic chemicals, acids, salts, and miscellaneous inorganic chemicals.

"Adhesives, Sealers, and Coatings." Minnesota Mining & Mfg. Co., St. Paul, Minn. 12 pages. This two-color, illustrated brochure describes 23 applications of adhesives, sealers, and coatings as used by the automotive industry.

"Idea to Product." Bassons Industries Corp., New York, N. Y. 12 pages. The company's personnel and products, including those formed of thermoplastic sheeting and those molded of reinforced plastic, are covered in this illustrated brochure.

"Research in Plastics." Manufacturing Chemists' Association, Inc., 15th and H Sts., N. W., Washington 5, D. C. 20 pages. The plastics research work being done at Massachusetts Institute of Technology under the sponsorship of MCA is described and illustrated in this brochure.

"BWH Industrial Rubber Products: Belting Technical Data." Boston Woven Hose & Rubber Co., Cambridge, Mass. 48 pages. This manual contains technical information on the firm's transmission, conveyor, and elevator belting.

"Powermaster Packaged Automatic Boilers." Bulletin 1219. Orr & Sembower, Inc., Reading, Pa. 16 pages. The 17 sizes of boilers from 15 through 500 hp. made by the firm for steam process and steam and hot water heating are described and illustrated.

"Stability of Oil-in-Water Emulsions." M. van den Tempel. Communication No. 225. Rubber-Stichting, Delft, Holland. 80 pages. Price, Hfl. 5 (5 Dutch florins). The fundamental properties of an emulsion of a water-immiscible oil in water have been studied in an attempt to determine the factors controlling the stability of *Hevea* latex as a colloidal system. The book may provide a means for investigating problems such as: Is the force preventing mutual adherence of rubber particles in latex of an electrostatic nature? Will the rubber particles in a gel or coagulum merge into one homogeneous mass of rubber, or retain their identity in the final product?

"Q. O. Furfuryl Alcohol." Bulletin 205. Quaker Oats Co., Chicago, Ill. 28 pages. General information, physical data, chemical and physical properties, typical reactions, and uses of this material are described in this booklet.

"Glass Textiles for Industry." Hess, Goldsmith & Co., New York, N. Y. 32 pages. This booklet contains the properties and specifications for three basic fiber-glass textile forms—broad fabrics, tapes, and parallel strand reinforcements—and describes some of the applications of these materials.

"Farval Centralized Systems of Lubrication." Bulletin No. 26. Farval Corp., Cleveland, O. 20 pages. The construction and operation of the various systems made by the company for machinery and equipment are described and illustrated.

"Hydraulic Jet Cleaners." Sellers Injection Corp, Philadelphia, Pa. 8 pages. Descriptions and applications of these heavy-duty plant and machinery clean-up units appear in this bulletin.

"Industrial V-Belts." Durkee-Atwood Co., Minneapolis, Minn. 60 pages. A description of industrial V-belts and their applications, plus the new increased horsepower ratings approved by The Rubber Manufacturers Association, Inc., is contained in this bulletin.

"Resistance Chart: Pennsalt Silicate, Resin and Sulfur Cements." CP-586. Pennsylvania Salt Mfg. Co., Philadelphia, Pa. This publication shows the resistance of seven classes of corrosion-resistant cements to 297 of the most generally used corrosive chemicals.

"Continuous Viscosity Measurement." Instrumentation Data Sheet No. 10.13-1a. Minneapolis Honeywell Regulator Co., Philadelphia, Pa. A description of the Brown Electronik recorder and Brookfield Viscometran, which give a continuous indication and record of a material's viscosity under processing conditions, appears in this publication.

"Tall Tales and Fabulous Facts." Dow Corning Corp., Midland, Mich. 24 pages. This tenth anniversary publication uniquely presents some of the uses to which the silicones made by the company have been put, including releasing agents, insulating resins, greases, finishes, damping fluids, and deformers.

Publications of the British Rubber Producers' Research Association, 48 Tewin Rd., Welwyn Garden City, Herts, England.

No. 176. **"The Hydrodynamics of Non-Newtonian Fluids: Part III**—The Normal Stress Effect in High-Polymer Solutions." H. W. Greensmith and R. S. Rivlin. 30 pages. Measurement of these effects and the precautions and corrections which must be applied are described, and the normal stress coefficient evaluated from the data is given.

No. 177. **"Determination of Particle Size in Natural Latex."** E. G. Cockbain. 6 pages. The soap titration method has been made applicable to natural rubber latices.

No. 178. **"Rupture of Rubber: Part I**—Characteristic Energy for Tearing." R. S. Rivlin and A. G. Thomas. 28 pages. A criterion for tearing of test pieces cut from thin sheets of a natural rubber vulcanizate, similar in form to the Griffith criterion for spreading of a crack, is formulated.

BIBLIOGRAPHY

Temperature Measurements in the Mooney Viscometer. R. H. Taylor, W. P. Ball, *ASTM Bulletin*, Sept., 1951, p. 60.

Polymerization of Styrene with Drying Oils in Aqueous Emulsion. I. I. Bezman, D. D. Browning, *Paint, Oil Chem. Rev.*, Sept. 27, 1951, p. 10B.

Compatibility of High Styrene Resins with Rubber. *Rubber Age (London)*, Sept., 1951, p. 230.

The Rheology of Rubber Solutions and Suspensions, I. L. Leaman, *Rubber Age (N. Y.)*, Sept., 1951, p. 699.

All-Welded Support for Multiple-Platen Press. O. E. Hermanns, *Rubber Age (N. Y.)*, Sept., 1951, p. 707.

A Low Temperature Flexibility Tester. M. A. Pollack, R. A. Emmett, A. G. Cobbe, *Rubber Age (N. Y.)*, Sept., 1951, p. 713.

Cements. C. R. Payne, *Ind. Eng. Chem.*, Oct., 1951, p. 2203.

Hard Rubber. H. Peters, *Ind. Eng. Chem.*, Oct., 1951, p. 2256; Oct., 1952, p. 2344.

Stabilization of Polyvinyl Chloride-Type Plastics. J. G. Hendricks, E. L. White, *Ind. Eng. Chem.*, Oct., 1951, p. 2335.

The Growth of Vinyl Chloride. D. S. Plumb, R. F. Hansen, *Chem. Eng. News*, Dec. 24, 1951, p. 5432.

Influence of Molecular Weight on the Properties of Polystyrene. E. H. Merz, L. E. Nielsen, R. Buchdahl, *Ind. Eng. Chem.*, June, 1951, p. 1396.

Elasticity of Soft Polymers. C. A. Dahlquist, J. O. Hendricks, N. W. Taylor, *Ind. Eng. Chem.*, June, 1951, p. 1404.

Water Extracts of Untreated and Masticated Rubbers. F. H. Cotton, K. O. Lee, *India Rubber J.*, June 2, 1951, p. 22.

Synthetic Rubber. A. G. Susie, *Frontier*, June, 1951, p. 4.

WITH EEMCO
RUBBER and PLASTICS
PROCESSING MACHINERY

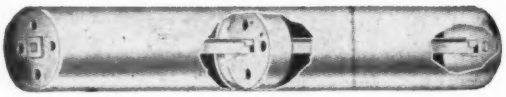
MILLS
CRACKERS
WASHERS
REFINERS
★ ★ ★
PRESSES
compression
transfer
fibre glass
reinforced
plastics
LABORATORY
MILLS & PRESSES

EEMCO
a leader in
RUBBER
and
PLASTICS
MACHINERY

If you are looking for answers to your rubber and plastics equipment problems, you will find them at EEMCO. Yes, they offer smoother sailing on many production problems with the machines which bear the EEMCO trademark. Skillfully designed by qualified engineers—and made by workmen with many years of experience—they offer the utmost in quality, design and workmanship. Serving manufacturers throughout the world, EEMCO rubber and plastics processing machines have proved their worth. EEMCO has its own Foundry, Machine Shop, and Engineering Department to insure fast delivery. Get prices and delivery dates from EEMCO where only the best has been built for many years.

EEMCO
ERIE ENGINE & MFG. CO.
Rubber & Plastics Machinery Division
12th St. & East Ave., Erie, Pa.

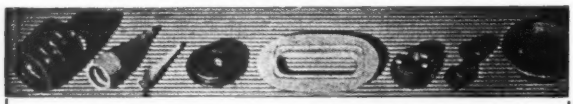
STEEL CALENDER STOCK SHELLS



ALL STEEL, ALL WELDED CONSTRUCTION, with forged steel hubs for 1¼", 1½" and 2" square bars. 4", 5", 6", 8", 10", 12", 15", 20" and 24" diameters. Any length. Also Special Trucks (Leaf Type) Racks, Tables and Jigs.

Used in manufacturing rubber and plastic products.

THE W. F. GAMMETER COMPANY
CADIZ, OHIO



INDUSTRIAL RUBBER GOODS
BLOWN — SOLID — SPONGE
FROM NATURAL, RECLAIMED, AND SYNTHETIC RUBBER
THE BARR RUBBER PRODUCTS CO. SANDUSKY OHIO

SINCE 1880 — RUBBER & PLASTIC

Rand. REG. U. S. PAT. OFF.

"They Last Longer" REG. U. S. PAT. OFF

DRESS SHIELDS
DRESS SHIELD LININGS
BABY PANTS
BABY BIBS & APRONS
SANITARY WEAR
RUBBERIZED SHEETING
RUBBER APRONS
STOCKINET SHEETS
RUBBER SHEETS
RAINCAPES & COATS
RUBBER SPECIALTIES
DOLL PANTS, CAPES, ETC.
RUBBER DAM & BANDAGES — SHEET GUM

RAND RUBBER CO. BROOKLYN, N. Y. U. S. A. MFRS.

CONSULTANTS & ENGINEERS

BERLOW AND SCHLOSSER CO.
Consultation and Technical Service
Paper, Textile and Wringer Rolls—Mechanicals
Molded Specialties—Cut Rubber Thread
401 INDUSTRIAL TRUST BUILDING
PROVIDENCE 3, R. I.

GIDLEY LABORATORIES, INC.
PHILIP TUCKER GIDLEY — "RESEARCH IN RUBBER"
Consulting engineering, formulas, product development, chemical and physical tests and factory surveys.
Fairhaven Massachusetts

HALE & KULLGREN, INC.
Specialists in Processes and Plants for Rubber and Plastics.
A Complete Engineering Service
including: Economic Surveys; Process Design; Installation; Contracting and Operation.
613 E. Tallmadge Ave., Akron 10, Ohio

FOSTER D. SNELL, INC.
Natural & Synthetic Rubber Technology
Compounding—Trouble Shooting—Testing
A personal discussion of your problems is suggested.
29 W. 15th St., New York 11, N. Y. WA 4-8800

Where the Compounding and Engineering problems of the Manufacturers may be solved.

Production of Carbon Black. D. J. Stern, *S. African Mining Eng. J.*, Feb. 2, 1952, p. 979.

New Method of Measurement of the Specific Surface Area of Carbon Black. P. A. Tesner, I. S. Rafal'kes, *Doklady Akad. Nauk S.S.S.R.*, 80, 401 (1951).

Behavior of Carbon Black in Rubber and Plastics. W. R. Smith, *Hule Mex. y Plast.*, 12, 71, 19 (1951).

Production of China Clay in France. M. H. Francon, *Rev. gén. caoutchouc*, 29, 169 (1952).

Surface of Finely Ground Silica. P. B. Dempster, P. D. Ritchie, *Nature*, 169, 538 (1952).

Surface Structure and Properties of Colloidal Silica and Alumina. E. A. Hauser, D. S. le Beau, *J. Phys. Chem.*, 56, 136 (1952).

Study of Two Colloidal Silicas, Use in Natural Rubber. P. Durou, *Bull. Lab. Recherches & Controle du Caoutchouc*, 26, 2 (1951).

Plasticizer Quality Test. C. J. Malm, L. B. Genung, M. L. Townsend, *Anal. Chem.*, 23, 1692 (1951).

Physical Theory of Rubber Reinforcement. A. M. Bueche, *J. Applied Phys.*, 23, 154 (1952).

New Abrasion Testing Machine for Textiles and Similar Materials. H. Mintrop, *Melliand Textilber.*, 32, 269 (1951).

Morphological Aspects of Abrasion and Wear. G. Salomon, *Engineering*, 173, 310 (1952).

Principles and Practical Consequences of the Statistical Theory of Elasticity. P. Thirion, *Rev. gén. caoutchouc*, 29, 46 and 198 (1952).

Plastics in Medicine. A. Muller, *Chemische Industrie*, 111, 773 (1951).

Application of Fungicides to Rubber-Like Polymers and Related Materials. R. Treichler, *Rubber Age (N. Y.)*, Aug., 1951, p. 579.

Reinforcing Agents and Reinforcement. J. R. Scott, *India Rubber J.*, Sept. 1, 1951, p. 4; Sept. 8, p. 4; Sept. 15, p. 4; Sept. 22, p. 20; Sept. 29, p. 9.

An Improved Electronic Flexometer for Bending Analysis and Stiffness Studies of Fabrics and Thin Plastics. H. H. Hebeler, H. J. Kolb, J. W. Stillman, J. H. Baldt, *ASTM Bulletin*, Sept., 1951, p. 52.

World Rubber Developments in 1950-51. W. N. Small, *For. Com. Weekly*, Mar. 3, 1952, p. 3.

Mechanical Stability Testing of *Hevea* Latex. E. W. Madge, H. M. Collier, I. H. Duckworth, *Trans. Inst. Rubber Ind.*, Feb., 1952, p. 15.

Relationships between the Physical Properties of Rubber Used in Engineering. S. G. Leontein, *Trans. Inst. Rubber Ind.*, Feb., 1952, p. 27.

Oxidation of *Hevea* and GR-S Polymers and Their Vulcanizates. N. V. C. Rao, H. Winn, J. R. Shelton, *Ind. Eng. Chem.*, Mar., 1952, p. 576.

Carbon Black Flocculation in Rubber to Metal Cements. G. M. Sheehan, G. Kraus, A. B. Conciatori, *Ind. Eng. Chem.*, Mar., 1952, p. 580.

Heat Distortion of Polystyrene. K. J. Cleereman, H. J. Karam, J. L. Williams, *ASTM Bulletin*, Feb., 1952, p. 37.

An Electrical Extensometer for Determining Elongation of Elastomers. C. H. Klute, C. J. Penther, L. B. McKee, *ASTM Bulletin*, Feb., 1952, p. 44.

The Pneumatic Tire. An Historical Survey. S. Hull, *India Rubber J.*, Mar. 8, 1952, p. 6; Mar. 15, p. 17; Mar. 22, p. 17.

Interaction of Polymers and Mechanical Waves. W. O. Baker, J. H. Heiss, *Bell System Tech. J.*, Mar., 1952, p. 306.

Plastic Processing Equipment Today. R. B. Seymour, J. H. Fry, *Chem. Eng.*, Mar., 1952, p. 136.

Fluotitanate Gelation of Latices. G. H. McFadden, B. Bennett, *Rubber Age (N. Y.)*, Mar., 1952, p. 748.

RBH Resin 510 in Natural Rubber. L. J. Radi, *R.B.H. Dispersions, Tech. Sec.*, Apr., 1952, p. 1.

Rubber for Industry. W. J. S. Naunton, *Can. Chem. Processing*, June 1, 1952, p. 38.

Infrared Analysis of Rubber Derivatives. G. Salomon, A. C. van der Schee, J. A. A. Ketelaar, B. J. van Eyk, *Rubber Chem. Tech.*, Apr.-June, 1952, p. 265.

Autoradiographic Technique with Carbon^{14} in Rubber. A. D. Kirshenbaum, C. W. Hoffman, A. V. Grosse, *Rubber Chem. Tech.*, Apr.-June, 1952, p. 291.

Heat Sensitivity of *Hevea* Latex. I-II. P. Cassagne, *Rubber Chem. Tech.*, Apr.-June, 1952, p. 303.

Evaluation of Tread Wear. D. G. Stechert, T. D. Bolt, *Rubber Chem. Tech.*, Apr.-June, 1952, p. 321.

Migration of Materials during Accelerated Aging by the Oxygen Pressure Method. M. B. Fackler, J. S. Rugg, *Rubber Chem. Tech.*, Apr., 1952, p. 331.

Estimation of the Technological Properties of Rubber Mixtures by Their Fluidity. F. I. Galperina, *Rubber Chem. Tech.*, Apr.-June, 1952, p. 339.

Non-Destructive Aging Tests for Rubber. R. F. Shaw, S. R. Adams, *Rubber Chem. Tech.*, Apr.-June, 1952, p. 342.

Oil Seals. E. T. Jagger, *Automobile Engr.*, 37, 383 (1947).

Comparison between Synthetic and Natural Rubber Pipe-Joint Rings. W. L. White, *J. Am. Water Works Assn.*, 43, 872 (1951).

Rubber Plus Chemistry. H. L. Fisher, *J. Chem. Education*, June, 1951, p. 328.

Production of Softened Rubber Direct from Latex. F. H. Cotton, K. O. Lee, *India Rubber J.*, June 16, 1951, p. 9.

South Africa

(Continued from page 683)

producing Dunlopillo; now the demand for these products by buses, other transport vehicles, to say nothing of local furniture manufacturers, has grown to the extent where there is talk of large-scale mass-production molding by the firm.

The Goodyear company at Uitenhage notes that interest in conveyor belts has developed among grape growers after they witnessed the economies and other improvements in grape handling that followed the installation of conveyor belts for a wine-cellar cooperative and for a firm of packers.

Engineering Development Corp., Germiston, Transvaal, reportedly intends to launch flexible conveyor belts of rubber and metal that can go around corners and through doors. Apparently 24-inch belts with capacity of 120 tons an hour and 32-inch belts with 170 tons' capacity are being planned.

S. A. Rubber Mfg. Co., Ltd., Howick, Natal, the largest producer of mechanical rubber goods in the Union, is expanding its factory and offices. The firm, established in 1919, currently employs more than 1,500 persons, produces a large variety of rubber goods for a number of local industries, and also does a thriving export trade.

Rubber toys are also getting the attention of local manufacturers. Vulco Chemical Co., Ltd., Johannesburg, which makes a wide range of latex toys, even claims to have succeeded in placing some of its items on the United States market.

Lately the foreign press has been circulating reports about discussions on the prospects of synthetic rubber manufacture in the Union. According to one source, a member of the Department of Commerce & Industry here pointed out that in 1951 the Union imported 28,450 tons of rubber at a cost of £10,744,924, and that it should be possible to replace at least half this amount by locally produced synthetic rubber. He is quoted as stating that a factory to produce 20,000 tons a year would require an expenditure of about £5,000,000, and that the rubber would cost 14-17d. a pound, depending on the process employed. Raw materials would be obtainable from local industries.

Another source learns that E. E. Pardee, of General Tire & Rubber Co., Akron, O., U.S.A., visited Pretoria recently to offer the Government of the Union the complete cooperation of his firm in the establishment of a synthetic rubber industry in South Africa.

VULCANIZED
VEGETABLE OILS

—RUBBER SUBSTITUTES—

•

Types, grades and blends for every purpose, wherever Vulcanized Vegetable Oils can be used in production of Rubber Goods—be they Synthetic, Natural, or Reclaimed.

•

A LONG ESTABLISHED AND PROVEN PRODUCT

THE CARTER BELL MFG. CO.
SINCE
CARTER BELL PRODUCTS
1903
SPRINGFIELD, NEW JERSEY

Represented by:
HARWICK STANDARD CHEMICAL CO.
Akron — Boston — Trenton — Chicago — Denver — Los Angeles

MARKET REVIEWS

RUBBER

A GENERAL price decline in both natural rubber spot and futures prices took place during the period from June 16 to July 15, although neither market showed any definite pattern of activity. Most of the trading in futures on the New York Commodity Exchange consisted of switching operations and exchanges for physical rubber. Moderate trading took place on the spot market early in the period, but much of this activity tapered off at the end of June as plants began their annual vacation shutdowns. During the first half of July interest in physical rubber was centered in October-December deliveries. A slight but noticeable increase in factory interest in physical rubber took place at the end of the period as the result of a trend from synthetic to natural rubber based on the latter's low and competitively attractive price.

Further impetus to this trend is expected to follow the government's recent decision to reduce GR-S production by about 100,000 tons a year.

NEW YORK SPOT MARKET
WEEK-END CLOSING PRICES

	Apr. 25	May 30	June 20	June 27	July 4	July 11
R. S. S.: #1	25.13	25.88	25.25	24.63	24.13	24.13
2	24.38	24.63	24.50	23.75	23.50	22.88
3	23.13	23.38	23.25	22.75	22.50	22.88
Latex Crepe						
#1 Thick	28.25	28.25	28.13	27.25	27.00	26.63
Thin	28.00	28.00	27.88	27.00	26.75	26.38
#3 Amber Blankets	22.75	22.88	22.13	21.50	21.25	21.25
Thin Brown Crepe	21.88	22.00	21.38	20.75	20.50	20.25
Flat Bark	20.00	20.38	20.25	19.50	19.25	19.13

The spot price for #1 Ribbed Smoked Sheets started the period at 25.15¢, rose to a high of 25.25¢ on June 18 and 19, fell steadily to a low of 23.75¢ on July 7, and then recovered slightly to close at 24.25¢. The June monthly average spot prices for certain grades were as follows: #1 R.S.S., 25.00¢; #3 R.S.S., 23.07¢; #3 Amber Blankets, 22.19¢; and Flat Bark, 20.14¢.

COMMODITY EXCHANGE
WEEK-END CLOSING PRICES

Futures	Apr. 25	May 30	June 20	June 27	July 4	July 11
Sept.	24.15	24.40	24.00	23.80	23.65	23.60
Dec.	23.75	24.10	23.70	23.50	23.65	23.40
Mar.	23.65	23.85	23.60	23.45	23.50	23.30
May	23.55	23.70	23.55	23.30	23.45	23.25
July	——	23.60	23.45	23.20	23.40	23.20
Total weekly sales, tons	2,280	940	650	2,510	1,330	930

September futures began the period at 24.19¢, touched a high of 24.20¢ on June 24, fell to a low of 23.20¢ on June 1, and then fluctuated irregularly to close at 23.65¢ on July 15. Sales in rubber futures during the second half of June amounted to 3,330 tons, making a total for the month of 7,700 tons. During the first half of July there were 3,240 tons sold on the New York Commodity Exchange.

The Office of Synthetic Rubber, RFC, announced that, effective July 17, the selling price of GR-I (butyl) rubber was increased to 22¢ a pound, plus the applicable uniform freight charge. Also effective July 17, the uniform freight charge on all sales of government produced synthetic rubbers was increased to 1.1¢ a pound on carload quantities, and 1.7¢ a pound on less-than-carload quantities.

Latex

DEMAND for *Hevea* latex continued at good levels during the period from June 16 to July 15 despite the seasonal slowdowns in certain manufacturing lines. Supplies were ample, and a slight price decline took place, particularly for long-term contracts. Market observers believe that supplies of natural latex will be ample for all requirements during the balance of the year and anticipate a further narrowing of the price differential between nearby and long-term contracts.

Final April and preliminary May domestic statistics on *Hevea* and synthetic rubber latices are given in the following table:

(All Figures in Long Tons, Dry Weight)

	Production	Imports	Consumption	Month-End Stocks
Natural latex				
April	0	6,302	5,937	7,428
May*	0	6,200	5,391	7,632
GR-S latices				
April	4,261	211	4,172	4,815
May*	4,552	232	4,036	5,406
Neoprene latex				
April	879	0	764	1,233
May*	721	0	642	1,133
Nitrile latices				
April	429	0	341	833
May*	429	0	316	744

*Preliminary.

SCRAP RUBBER

TRADING in scrap rubber was very dull during the period from June 16 to July 15. Most consumers were out of the market owing to plant shutdowns for vacations and inventory taking, and the little activity which took place consisted of fill-ins on open orders. Most scrap dealers believe that reclaimers will resume purchasing on a limited scale when they return to the market in August, and the outlook for an upswing in demand for scrap rubber is far from promising.

Slight declines in prices for butyl tubes in the East and at Akron, and for red tubes at Akron took place during the period. Following are dealers' selling prices for scrap rubber, in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$12.00	$13.50
S. A. G. auto tires	Nom.	Nom.
Truck tires	Nom.	15.00
Peelings, No. 1	40.00	40.00 / 42.00
2	Nom.	24.00
3	16.00 / 18.00	18.00
	(¢ per Lb.)	
Auto tubes, mixed	2.00	2.50
Black	3.25	3.50
Red	9.75	10.25
Butyl	1.75	2.00

RECLAIMED RUBBER

A SLIGHT decrease in reclaimed rubber production was noted during the period from June 16 to July 15 as plants began to shut down for vacations and inventory-taking. In view of a continuing high level of automobile production, renewed demand for reclaim is expected when the seasonal let-down ends about mid-August.

Final April and preliminary May statistics on the domestic reclaimed rubber industry are now available. April figures, in long tons, are: production, 28,714; imports, 318; consumption, 26,483; exports, 1,261; and month-end stocks, 31,263. Preliminary figures for May, in long tons, are: production, 26,620; imports, 292; consumption, 25,213; exports, 1,188; and month-end stocks, 31,751.

Reclaimed Rubber Prices

	Lb.
Whole tire: first line	$0.10
Fourth line	.0875
Inner tube: black	.15
Red	.2425
Butyl	.125
Pure gum, light colored	.2425
Mechanical, light colored	.135

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE
WEEK-END CLOSING PRICES

Futures	April 25	May 30	June 20	June 27	July 4	July 11
Oct.	33.54	33.77	33.86	33.85	33.78	33.96
Dec.	33.59	33.80	33.96	33.98	33.93	34.12
Mar.	33.71	33.84	34.12	34.16	34.15	34.29
May	33.70	33.82	34.11	34.22	34.17	34.32
July	33.48	33.60	33.83	34.04	33.96	34.14
Oct.	——	33.05	33.06	33.24	33.23	33.37

THE moderate trading and narrow price fluctuations noted in the preceding month continued to characterize the cotton market on the New York Cotton Exchange during the period from June 16 to July 15. Reports of new crop damage by drought in the southeastern region spurred a moderate price advance early in July, but this spurt was quickly tempered by reports that the new crop and the large carry-over at the end of the current season would more than cover estimated requirements.

On July 8 the United States Department of Agriculture issued its first report on the new crop, estimating that 24,618,000 acres were in cultivation. This figure is about 9% under 1952 plantings, but still above the 1942-1951 average. The first production estimate by the Department will be issued in August.

The spot price for 15/16-inch middling cotton started the period at 34.15¢, fell to a low of 33.90¢ on June 24 and again on July 1, rose to a high of 34.55¢ on July 7, and closed at 34.30¢ on June 15. Futures prices followed the same general pattern: October futures started at 33.80¢, reached a low of 33.68¢ on July 2 and a high of 34.18¢ on July 8, and ended the period at 34.05¢.

Fabrics

Trading in wide industrial fabrics was moderate during the period from June 16 to July 15. Wide sateens, broken twills, cotton ducks, and sheetings sold in limited quantities at relatively steady prices for

RMP
ANTIMONY
FOR RED RUBBER

. . . . The utmost in pleasing appearance with no deteriorating effect whatever.

●

RARE METAL PRODUCTS CO.
ATGLEN, PA.

Armour

Fatty Acids

for Rubber

RUBBER STEARIC

DOUBLE PRESSED STEARIC

PURE STEARIC

OLEIC ACID

RED OIL

CORN OIL ACID

Manufactured by
ARMOUR CHEMICAL DIVISION

Represented by

TUMPEER CHEMICAL CO.
333 NORTH MICHIGAN AVENUE
CHICAGO 1, ILLINOIS

QUALITY **INTEGRITY** **SERVICE**

72 YEARS WITHOUT REORGANIZATION

BELTING
Transmission—Conveyor—Elevator

HOSE
for every purpose
Water—Fire—Air—Steam

HOME RUBBER CO. TRENTON, N. J. STEAM NEVER BURN BLOW OUT. PACKING. CHICAGO NEW YORK

PACKING
Sheet & Rod Packings
for every condition

Mechanical Specialties of Every Description

HOME RUBBER COMPANY
Factory & Main Office
TRENTON 5, N. J.

LONDON: 107 Clifton St., Finsbury CHICAGO: 168 North Clinton St. NEW YORK: 80-82 Reade St.

Top-Quality that never varies!

THE GENERAL TIRE & RUBBER COMPANY
AKRON, OHIO

AZUSA, CALIFORNIA • BOWLING GREEN, OHIO • CUYAHOGA FALLS, OHIO
WACO AND BAYTOWN, TEXAS • JEANNETTE, PENNSYLVANIA
BARNESVILLE, GEORGIA • LOGANSPORT AND WABASH, INDIANA
FOREIGN OPERATIONS: RIO DE JANEIRO, BRAZIL • TORONTO, CANADA
TEL AVIV, ISRAEL • MEXICO CITY, MEXICO • MAIPU, CHILE
MADRID AND TORRELAVEGA, SPAIN • OPONTO AND LOUSADA, PORTUGAL
CARACAS, VENEZUELA • PORT ELIZABETH, SOUTH AFRICA

late July and early August delivery. The automotive industry has not yet shown any inclination to buy further ahead in quantity on wide coating fabrics. Both coaters and automobile manufacturers apparently are operating on a 30-60 day coverage basis, but a heavier demand is expected to develop within the next few weeks.

Cotton Fabrics

Drills		
59-inch 1.85-yd.	yd.	$0.38
2.25-yd.		.34
Osnaburgs		
40-inch 2.11-yd.	yd.	.235 / $0.2375
3.65-yd.		.155 / .165
Ducks		
38-inch 1.78-yd. S. F.	yd.	.3875
2.00-yd. D. F.		.31 / .315
51.5-inch, 1.35-yd. S. F.		.51¼
Hose and belting		.67
Raincoat Fabrics		
Print cloth, 38½-inch, 64x60	yd.	.155 / .165
Sheeting, 48-inch, 4.17-yd.		nom.
52-inch, 3.85-yd.		nom.
Chafer Fabrics		
14.30-oz./sq. yd. Pl.	lb.	.73
11.65-oz./sq. yd. S.		.65
10.80-oz./sq. yd. S.		.6875
8.9-oz./sq. yd. S.		.70
Other Fabrics		
Headlining, 68-inch, 1.45-yd., 2-ply	yd.	.5725
64-inch, 1.25-yd., 2-ply		.63 / .6325
Sateens, 53-inch, 1.32-yd.		.575
58-inch, 1.21-yd.		.6275 / .63

RAYON

TOTAL shipments of all types of rayon by domestic producers amounted to 108,500,000 pounds in June, a decrease of 0.5% from the preceding month's figure. Shipments for the first half of this year totaled 619,000,000 pounds, or 17.5% more than during the corresponding period last year.

June figures for high-tenacity viscose rayon yarn were: calculated production, 40,700,000 pounds, or 100% of rated capacity; domestic shipments, 39,300,000 pounds; exports, 100,000 pounds; and month-end stocks, 6,700,000 pounds.

Tire cord and fabric production during the first quarter of 1953 amounted to 136,000,000 pounds. This total consists of: cotton tire fabric, 4,000,000 pounds; rayon woven tire fabric, 92,000,000 pounds; unwoven rayon tire cord, 20,000,000 pounds; nylon cord and fabric, 4,000,000 pounds; and cotton chafer fabric, 16,000,000 pounds.

No changes were made in rayon tire yarn and fabric prices during the period from June 16 to July 15, and current prices follow:

Rayon Prices

Tire Yarns

1100 480	$0.62	/ $0.63
1100 490		.62
1150 490		.62
1165 480		.63
1650 720		.61
1650 980		.61
1820 980		.61
2200 960		.60
2200 980		.60
2200 1466		.67
4400 2934		.63

Tire Fabrics

1100 490 2		.72
1650 980 2	$0.659	.73
2200 980 2		.685

Rayon Cord Twisting Device

American Enka Corp., New York, N. Y., has developed a device which can be used in normal rayon cord twisting operations. It is reported that use of the device has resulted in cord with substantial improvement in strength, better uniformity, and generally superior properties. Further information on this device was not available from the company.

Compounding Ingredients—Price Changes and Additions

Accelerators, Organic

Accelerator 49	lb.	$0.53 /	$0.54
DPG	lb.	.48 /	.49
DOTG	lb.	.57 /	.58
Ethylac	lb.	.93 /	.95
MBT	lb.	.38 /	.40
XXX	lb.	.49 /	.51
MBTS	lb.	.48 /	.50
Merac	lb.	.75 /	1.05
NOBS No. 1	lb.	.69 /	.71
S. A. 52	lb.	1.14	
57, 62, 67, 77	lb.	1.04	
66	lb.	2.50	
Vulcacure NB (*liquid*)	lb.	.45	
ZB	lb.	.85	
ZM	lb.	.85	
ZE	lb.	.85	

Antioxidants

Styphen I	lb.	.495 /	.545

Latex Compounding Ingredients

Alcogum AN-6 (*liquid*)	lb.	.05	

Mold Lubricants

Polyglycol E4000	lb.	.33 /	.39

Plasticizers and Softeners

Baker AA Oil	lb.	.235 /	.28
Crystal O Oil	lb.	.235 /	.295
Processed oils	lb.	.24 /	.275
Good-rite GP 233	lb.	.45 /	.59
261	lb.	.37 /	.51

Synthetic Resins

Kralastic	lb.	.65 /	1.30

Vulcanizing Agents

Vultac #2	lb.	.47 /	.755
#3	lb.	.51 /	.795

Carbon Black Statistics — First Quarter, 1953

Below are statistics for output, shipments, producers' stocks, and exports of carbon black for the first quarter, 1953. Furnace blacks are classified as follows: SRF, semi-reinforcing furnace black; HMF, high modulus furnace black; FEF, fast extruding furnace black; and HAF, high abrasion furnace black.

(Thousands of Pounds)

	Jan.	Feb.	Mar.
Production			
Furnace types			
Thermal	8,789	8,706	8,910
SRF	22,274	20,881	22,222
HMF	9,889	9,393	10,944
FEF	18,826	16,538	18,469
HAF	41,100	39,806	42,691
Total furnace	100,878	95,324	103,236
Contact types	41,450	37,584	41,286
Totals	142,328	132,908	144,522
Shipments			
Furnace types			
Thermal	9,704	7,942	8,243
SRF	24,124	22,209	26,426
HMF	10,397	10,475	11,870
FEF	18,305	17,447	21,098
HAF	37,417	34,369	42,769
Total furnace	99,947	92,442	110,406
Contact types	38,710	34,261	39,842
Totals	138,657	126,703	150,248
Producers' Stocks, End of Period			
Furnace types			
Thermal	2,368	3,132	3,799
SRF	29,163	27,835	23,631
HMF	33,599	32,517	31,591
FEF	22,199	21,290	18,661
HAF	34,117	39,554	39,476
Total furnace	121,446	124,328	117,158
Contact types	237,067	240,390	241,834
Totals	358,513	364,718	358,992
Exports			
Furnace types	13,968	12,152	12,913
Contact types	13,843	9,774	16,409
Totals	27,811	21,926	29,322

SOURCE: Bureau of Mines, United States Department of the Interior, Washington 25, D. C.

Estimated Automotive Pneumatic Casings and Tubes, Shipments, Production, Inventory, May, April, 1953; First Five Months, 1953, 1952

	May, 1953	% of Change from Preceding Month	April, 1953	First Five Months, 1953	First Five Months, 1952
Passenger Casings					
Shipments					
Original equipment	2,821,520		3,289,979	14,477,987	9,997,061
Replacement	4,815,793		4,264,652	19,950,298	16,863,320
Export	74,596		44,752	222,194	235,121
Total	7,711,909	−1.48	7,599,383	34,650,479	27,095,502
Production	7,655,098	−2.27	7,832,741	37,078,162	30,486,330
Inventory end of month	13,655,727	−0.07	13,665,786	13,655,727	10,388,646
Truck and Bus Casings					
Shipments					
Original equipment	378,009		507,775	2,356,015	2,442,963
Replacement	788,044		735,859	3,941,336	3,290,714
Export	64,189		70,188	287,908	428,542
Total	1,230,242	−6.36	1,313,822	6,585,259	6,162,219
Production	1,331,426	−6.85	1,429,390	7,051,468	7,244,968
Inventory end of month	3,317,751	−3.46	3,206,643	3,317,751	2,874,752
Total Automotive Casings					
Shipments					
Original equipment	3,199,529		3,797,754	16,834,002	12,440,024
Replacement	5,603,837		5,000,511	23,891,634	20,154,034
Export	138,785		114,940	510,102	663,663
Total	8,942,151	+0.32	8,913,205	41,235,738	33,257,721
Production	8,986,524	−2.98	9,262,131	44,129,630	37,731,298
Inventory end of month	16,973,478	+0.60	16,872,429	16,973,478	13,263,398
Passenger, Motorcycle, Truck and Bus Inner Tubes					
Shipments					
Original equipment	3,199,780		3,796,819	16,840,744	12,413,806
Replacement	3,315,051		2,896,326	16,789,981	13,288,679
Export	71,263		67,087	282,437	458,782
Total	6,586,094	−2.58	6,760,232	33,913,162	26,161,267
Production	6,939,880	−8.01	7,544,244	34,727,738	27,512,690
Inventory end of month	12,591,578	+3.59	12,154,854	12,591,578	11,492,670

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

Effective July 1, 1947

GENERAL RATES

Light face type $1.25 per line (ten words)
Bold face type $1.60 per line (eight words)
Allow nine words for keyed address.

SITUATIONS WANTED RATES

Light face type 40c per line (ten words)
Bold face type 55c per line (eight words)

SITUATIONS OPEN RATES

Light face type $1.00 per line (ten words)
Bold face type $1.40 per line (eight words)

Letter replies forwarded without charge, but no packages or samples.

Address All Replies to New York Office at 386 Fourth Avenue, New York 16, N. Y.

SITUATIONS OPEN

COMMISSION SALES AGENT WANTED
for shoe industrial equipment — Aluminum Lasts. Knowledge of the footwear field essential.
ADDRESS BOX NO. 1336,
c/o INDIA RUBBER WORLD
386 Fourth Avenue, New York 16, N. Y.

OPPORTUNITY FOR A DEVELOPMENT, TOOLING, AND PROCessing rubber engineer with unusual metal-to-rubber experience, including specialty motor mounts and similar items. This is an opportunity for an energetic, practical man who can engineer special applications from design through tooling and production. Our plant is in a small Michigan city, staffed with a fine group of permanent personnel who know of this ad and need help with expanding business. Address Box No. 1337, care of INDIA RUBBER WORLD.

SALES REPRESENTATIVE

To travel extensively in Western Europe on salary and bonus arrangement. Experienced in the sale of raw materials to the rubber and plastics industries. Furnish complete résumé showing experience, education, languages, etc. Excellent opportunity with large American company. Our employes know of this ad. Address Box No. 1338, care of INDIA RUBBER WORLD.

WANTED: FOREMAN FOR MECHANICAL GOODS PLANT IN Chicago area. Write full past experience and salary expected. Address Box No. 1339, care of INDIA RUBBER WORLD.

LATEX CHEMIST: NATIONALLY KNOWN COMPANY HAS AN opening for a man capable of assuming full responsibility for developing synthetic latices for use as paint vehicles. This work involves preparation and evaluation of mechanically stable, film forming latices from various monomers and monomer mixtures. Experience in latex emulsions specifically for paint valuable but not as essential as fundamental knowledge of emulsion polymerization technology. Excellent opportunity for advancement to position of considerable responsibility. Liberal pension, insurance and hospitalization plans. Salary open. Location: Midwest. In first letter give complete résumé of experience, education, availability, salary requirements, and enclose small photograph. Our personnel know of this ad. Address Box No. 1340, care of INDIA RUBBER WORLD.

WANTED: COMBINATION CHEMIST AND ASSISTANT PRODuction superintendent for molded rubber products plant employing 100. Located in fine midwestern city. Excellent opportunity to grow with a live organization. Salary starts at approximately $7,000. Future salary limited only by your worth to us. Address Box No. 1341, care of INDIA RUBBER WORLD.

CHIEF CHEMIST: MUST BE COLLEGE GRADUATE, PREFERably under 40 years old. Old established company with plant in East specializing in molded rubber products. Job requires personality suitable for occasional technical sales work. Unusual opportunity to assume eventually responsible position of retiring personnel. Some experience in chemically-blown rubber or potential ability to develop same desired. Write full background. Replies held in strict confidence. Address Box No. 1342, care of INDIA RUBBER WORLD.

YOUNG GRADUATE MECHANICAL ENGINEER TO DESIGN jigs, fixtures, and other ways to accomplish operations pertinent to custom molding of rubber and synthetic rubber faster and more economically. Should have practical experience. Southern California location with small aggressive firm. State qualifications. Address Box No. 1343, care of INDIA RUBBER WORLD.

RUBBER—SALES

Compounded Latex Technical Sales & Service. Unusual opportunity with national company presently in Rubber sales adding Compounded Latex Division. Experience with Natural & Synthetic Rubber Latex Compounds sales & service essential. Address Box No. 1354, care of INDIA RUBBER WORLD.

RUBBER CHEMIST—EXPERIENCED IN COMPOUNDING OIL-resistant synthetic rubbers, familiar with rubber molding techniques, and rubber-to-metal adhesive applications. Will consider minimum of experience because of comparative newness of this activity, and opportunity for experimental and development work by individual with interest in this phase of chemistry. Position offers opportunity for advancement in responsibility and salary. Address Box No. 1355, care of INDIA RUBBER WORLD.

SITUATIONS OPEN (Continued)

RUBBER CHEMIST OR CHEMICAL ENGINEER EXPERIenced in development and production processing of natural and synthetic bonded rubber-to-metal goods involving Pilot-Plant and Production operations in the manufacture of a large variety of high-quality products. Familiar with compounding, mixing, tubing, calendering, and vulcanization. Experience in processing of metal and cement for bonding desirable. Refer to CE—III, P. O. Box 369, Erie, Pennsylvania.

CHEMIST FAMILIAR WITH MANUFACTURE OF NATURAL and synthetic type Latex and Solvent Adhesives. Must be capable of taking complete charge of Department. New England location. Address Box No. 1356, care of INDIA RUBBER WORLD.

SITUATIONS WANTED

LATEX. SPECIALIST SEEKS CHANGE. 20 YEARS' EXPERIENCE Production, Development, Sales, Management. Compounds, natural and synthetic. Dipping, Casting, Rug and Felt Backing, Adhesives, Reclaim and Resin Dispersions, Colloids in general. Excellent references U.S.A. and England. Medium sized or small company preferred. Address Box No. 1344, care of INDIA RUBBER WORLD.

LATEX CHEMIST: CONSIDERABLE EXPERIENCE IN COMpounding natural and synthetic latex for the textile field. Slight laboratory experience with foam latex. Desires technical sales position. Presently employed. Have had both production and sales experience. Address Box No. 1345, care of INDIA RUBBER WORLD.

RUBBER TECHNOLOGIST—CHEMICAL ENGINEER. NINE years' experience development compounding rubber and plastics, engineering, application, and production, all phases mechanical rubber goods. Desire responsible management position. Address Box No. 1346, care of INDIA RUBBER WORLD.

ASSISTANT TECHNICAL DIRECTOR—HIGH-GRADE TECHNIcal background, preferably rubber, but strong in chemical, plastics, or coating field. Proven ability to administer and supervise. Salary substantial. Good opportunity. Address Box No. 1347, care of INDIA RUBBER WORLD.

ADHESIVE CHEMIST WITH 10 YEARS' EXPERIENCE IN INdustrial adhesives and coatings including research, development, technical sales and overall factory management desires permanent position with future. Address Box No. 1353, care of INDIA RUBBER WORLD.

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: FARREL 16" x 48" AND 15" x 36" 2-ROLL RUBBER Mills, and other sizes up to 84". Also new lab. 6" x 12" & 6" x 16" Mixing Mills and Calenders. Extruders, 1" to 6". Baker-Perkins Mixers 100, 50, and 9 gals., heavy-duty double-arm. 350-ton upstroke Hydr. Press, 22" x 24" platens. Brunswick 200-ton Hydraulic Presses 21" x 21" platens. Large stock of hydraulic presses from 12" x 12" to 48" x 48", platens from 50 to 2,000 tons. Hydraulic Pumps and Accumulators. Rotary Cutters. Stokes Automatic Molding Presses. Single punch & rotary Preform Machines. Banbury Mixers. Crushers, Churns, Rubber Bale Cutters, etc. SEND FOR SPECIAL BULLETIN. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT CO., 107 — 8th St., Brooklyn 15, N. Y. STerling 8-1944.

FOR SALE
AT A TREMENDOUS SAVING
NEW MODERN INCINERATOR
Morris & Boulger incinerator designed to burn 24 tons per 24-hour period, oil fired, with Diesel-driven blower. All packed in boxes for erection. Price and detailed information on request.
DALTON SUPPLY CO.
719 — 16th Ave. Belmar, N. J.

FINANCIAL

Boston Woven Hose & Rubber Co., Cambridge, Mass. Nine months to May 31, 1953: net income, $187,475, equal to 42¢ each on 344,000 common shares, contrasted with $474,323, or $1.25 a share, a year earlier; sales, $13,766,761, against $15,945,019.

Collins & Aikman Corp., New York, N. Y. Quarter ended May 31, 1953: net income, $164,000, equal to 30¢ a common share, against $278,000, or 50¢ a share, in the 1952 quarter.

Dow Chemical Co., Midland, Mich., and subsidiaries. Year ended May 31, 1953: net profit, $35,856,926, equal to $1.58 a common share, compared with $35,818,010, or $1.57 a share, in the preceding year; net sales, $430,384,649, against $407,158,799; income taxes, $50,700,000, against $73,700,000.

Diamond Alkali Co., Cleveland, O. First six months, 1953: net earnings, $3,438,122, equal to $1.40 each on 2,263,303 common shares, compared with $2,844,672, or $1.14 a share, a year earlier; net sales, $43,439,558, against $38,738,446.

The Eagle-Picher Co., Cincinnati, O., and domestic subsidiaries. Six months ended May 31, 1953: consolidated net income, $1,787,107, equal to $1.81 a share, against $1,709,047, or $1.73 a share, in the preceding year's period; net sales, $45,477,688, against $35,698,827.

Firestone Tire & Rubber Co., Akron, O., and subsidiaries. Six months ended April 30, 1953: net earnings, $21,111,726, equal to $5.32 each on 3,928,877 common shares, compared with $19,018,905, or $4.81 each on 3,903,868 shares, a year earlier; sales, $487,879,427, against $465,187,866.

General Cable Corp., New York, N. Y. First half, 1953: net earnings, $2,971,347, equal to $1.36 each on 1,933,372 common shares, against $2,469,954, or $1.10 a share, in last year's half.

Crown Cork & Seal Co., Inc., Baltimore, Md. Initial half, 1953: net earnings, $416,587, equal to 12¢ a share, against $626,217, or 29¢ a share, a year ago.

General Electric Co., Schenectady, N. Y. Initial half, 1953: net earnings, $75,417,000, equal to $2.61 a common share, contrasted with $57,119,000, or $1.98 a share, in the first half last year; sales, $1,560,448,000, against $1,171,202,000.

Johns-Manville Corp., New York, N. Y., and subsidiaries. First six months, 1953: net income, $11,356,849, equal to $3.58 a common share, against $11,917,187, or $3.77 a share, in the preceding year's half; sales, $123,448,405, against $116,339,938.

Mohawk Rubber Co., Akron, O. Five months to May 31, 1953: net earnings, $193,096, equal to $1.37 a common share, compared with $312,022, or $2.20 a share, in last year's period.

Monsanto Chemical Co., St. Louis, Mo., and subsidiaries, except British and Australian ones. Initial half, 1953: net earnings, $13,503,974, equal to $2.51 each on 5,270,051 common shares, contrasted with $11,100,852, or $2.05 a share, in the first half of 1952; sales, $175,278,971, against $126,329,292.

National Automotive Fibres, Inc., Trenton, N. J., and wholly owned subsidiaries. First half, 1953: net profit, $2,093,921, equal to $2.10 a common share, contrasted with $986,386, or 99¢ a share, in the 1952 half; net sales, $47,577,693, against $38,614,804.

National Rubber Machinery Co., Akron, O. Four months ended April 30, 1953: net income, $316,455, equal to $1.80 a common share, against $532,900, or $3.03 a share, in the 1952 period.

Okonite Co., Passaic, N. J. Initial half, 1953: net profit, $1,500,626, equal to $9.39 a common share, against $1,056,731, or $7.08 a share, in the 1952 period.

O'Sullivan Rubber Corp., Winchester, Va. First half, 1953: net earnings, $98,650, equal to 21¢ a common share, against $53,843, or 9¢ a share, in the 1952 half.

Phillips Petroleum Co., Bartlesville, Okla. June half, 1953: net income, $34,244,846, equal to $2.34 a share, compared with $38,933,442, or $2.69 a share, a year earlier.

Rome Cable Corp., Rome, N. Y. Year ended March 31, 1953: net earnings, $2,008,000, equal to $4.01 each on 500,273 common shares, compared with $1,753,000, or $3.58 each on 481,752 shares, in the preceding fiscal year; net sales, $54,633,000, against $42,658,000; taxes, $6,021,000, against $5,268,000.

Shell Oil Co., New York, N. Y. First six months, 1953: net profit, $50,744,359, equal to $3.77 a share, compared with $42,554,913, or $3.16 a share, in the 1952 period.

U. S. Rubber Reclaiming Co., Inc., Buffalo, N. Y. Twenty-four weeks ended June 21, 1953: net income, $134,552, against $100,943, in the 24 weeks ended June 15, 1952.

Union Carbide & Carbon Corp., New York, N. Y. June half, 1953: net profit, $52,478,580, equal to $1.82 each on 28,806,344 capital shares, compared with $46,440,458, or $1.61 a share, in the 1952 half; net sales, $528,155,328, against $452,875,394.

Westinghouse Air Brake Co., Wilmerding, Pa. June half, 1953: net income, $4,916,847, equal to $1.19 a common share, against $5,393,536, or $1.30 a share, in the 1952 half.

S. S. White Dental Mfg. Co., Philadelphia, Pa. Initial half, 1953: net profit, $433,645, equal to $1.02 a common share, against $406,027, or $1.16 a share, the year before.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Anaconda Wire & Cable Co.	Com.	$0.75	July 21	July 7
Baldwin Rubber Co.	Com.	0.10 extra	July 27	July 15
		0.15 q.	July 27	July 15
Borg-Warner Corp.	Pfd.	0.87½ q.	Oct. 1	Sept. 16
Boston Woven Hose & Rubber Co.	Com.	0.20	Aug. 25	Aug. 14
Collins & Aikman Corp.	Com.	0.40	Sept. 1	Aug. 18
Crown Cork & Seal, Ltd.	Com.	0.50 q.	Aug. 15	July 17
Crown Cork International Corp.	$1 Cl. A	0.25 q.	Oct. 1	Sept. 14
Denman Tire & Rubber Co.	Com.	0.10	June 30	June 23
DeVilbiss Co.	Com.	0.30 q.	July 20	July 10
E. I. du Pont de Nemours & Co., Inc.	$4.50 Pfd.	1.12½ q.	July 25	July 10
	$3.50 Pfd.	0.87½ q.	July 25	July 10
Firestone Tire & Rubber Co.	Com.	0.75	July 20	July 6
General Motors Corp.	$5.00 Pfd.	1.25 q.	Aug. 1	July 6
	$3.75 Pfd.	0.93¾ q.	Aug. 1	July 6
Goodall-Sanford, Inc.	4% Pfd.	1.00 q.	Sept. 1	Aug. 14
	6% Pfd.	0.75 q.	Sept. 1	Aug. 14
Johnson & Johnson	Com.	0.35 q.	Sept. 11	Aug. 28
	4% Pfd.	1.00 q.	July 31	July 31
I. B. Kleinert Rubber Co., Inc.	Com.	0.25	Sept. 11	Aug. 28
Lee Rubber & Tire Corp.	Com.	0.75 q.	Aug. 1	July 15
Okonite Co.	Com.	0.50	Aug. 1	July 17
Thermoid Co.	$2.50 Pfd.	0.62½ q.	Aug. 1	July 10
Viceroy Mfg. Co., Ltd.	Com.	*	——	July 8

*A stock dividend of two preferred shares of $1 par value, payable at a date not yet fixed, for each common share held.

Trade Lists Available

The Commercial Intelligence Division recently published the following trade lists, of which mimeographed copies may be obtained by firms domiciled in the United States from this Division and from Department of Commerce Field Offices. The price is $1 a list for each country.

Aircraft and Aeronautical Supply and Equipment Importers and Dealers: Canada.

Automobile Vehicle & Equipment Importers & Dealers: British Honduras; Egypt; Peru.

Automotive Equipment Importers and Dealers: Switzerland.

Automotive Product Manufacturers: United Kingdom.

Boot and Shoe Importers and Dealers: British Guiana; Netherlands West Indies.

Boot and Shoe Manufacturers: Hong Kong; Portugual.

Chemical Importers & Dealers: Colombia; Haiti.

Dental Supply Houses: Venezuela.

Electrical Supply & Equipment Importers & Dealers: Bolivia; Brazil; Egypt; El Salvador; Luxembourg; Netherlands; West Indies; Nicaragua; Paraguay; British Guiana; Ecuador, Guatemala; Honduras; Netherlands; New Zealand, Pakistan.

Office Supply & Equipment Importers & Dealers: Paraguay.

Plastic Material Manufacturers, Molders, Laminators & Fabricators of Plastic Products: Ireland.

Rubber Goods Manufacturers: Austria.

Sporting Goods, Toy & Game Importers: India.

MACHINERY AND SUPPLIES FOR SALE (Continued)

STOKES ROTARY PELLET PRESSES—RD-3 AND RDS-3; KUX Model 25; Ball & Jewell Stainless Steel Rotary Cutter #1½; Mikro Pulverizers #1-SH, #1-SI, #2-TH, #2-SI, #2-DH. Large stock steel and stainless steel tanks and kettles. PERRY EQUIPMENT CORP., 1424 N. 6th St., Philadelphia 22, Pa.

1—USED 48 x 48 TRIPLE-DECK HYDRAULIC RUBBER MOLDing Press with 16" ram. Good condition. 1—used 42 x 42 Triple-Deck Hydraulic Rubber Molding Press with 14" ram. Good condition. Address Box No. 1348, care of INDIA RUBBER WORLD.

FOR SALE: 3 GAS-FIRED RECIRCULATING HOT AIR OVENS, leach tanks, and all sizes aluminum dipping forms for complete dolls and doll parts. Available immediately. Address Box No. 1349, care of INDIA RUBBER WORLD.

BANBURY BODIES REBUILT AND HARD-SURFACED. LONG experience. Precision workmanship. Spare parts available for all sizes, and we can fabricate any part required. Inspection of your installation in your plant on request. Write for estimates. INTERSTATE WELDING SERVICE, Offices, Metropolitan Bldg., Akron 8, Ohio.

FOR YOUR RUBBER PROCESSING MACHINERY REQUIREMENTS

Reconditioned ***New*** ***Used***

Mills — Hyd. Presses — Calenders — Banbury Mixers — Pumps — Extruders — Bale Cutters — Slitters — Vulcanizers — Grinders — Croppers — etc.

As well as all miscellaneous equipment necessary to the processing of rubber, contact the:

AKRON RUBBER MACHINERY CO., INC.

When buying or selling, try

AKRON RUBBER MACHINERY CO., INC.

200 South Forge Street Phone: Hemlock 9141 Akron 9, O.

"ANNALS OF RUBBER"

A Chronological Record of the Important Events in the History of Rubber

—50c per Copy—

INDIA RUBBER WORLD

386 Fourth Ave. New York 16, N. Y.

USED MACHINERY FOR SALE

1—Ambaco Model 3A Continuous Baler.
1—Stewart Bolling 2-roll Lab. Mill 6" x 12".
1—Thropp 2-roll Rubber Mill 10"x24".
2—Thropp 2-roll Rubber Mills, 18"x50".
1—Thropp 2-roll Rubber Mill 14" x 30".
1—Adamson Vulcanizer, 2' x 12' with quick opening door.
1—Ball & Jewell Stainless Steel #0 Rotary Cutter with Motor.
1—Paul O. Abbe #2 Master Rotary Cutter with Ball Bearings.
1—Welding Engr. Stainless Steel #2 Extruder.
1—Sprout Waldron Attrition Mill, Type 36 with 2 — 75 HP Motors.

WE ARE INTERESTED IN PURCHASING ALL TYPES OF RUBBER machinery consisting of mills, Banbury mixers, extruders, calenders, vulcanizers etc. and also complete plants.

R. GELB & SONS Inc.
STATE HIGHWAY No. 29, UNION, N.J.
UNIONVILLE-2-4900

Economical **NEW** Efficient

Mills - Spreaders - Churns
Mixers - Hydraulic Presses
Calenders

...GUARANTEED...

Rebuilt Machinery for Rubber and Plastics

LAWRENCE N. BARRY

41 Locust Street Medford, Mass.

RUBBER HARDNESS

THE LANGUAGE OF THE RUBBER INDUSTRY SINCE 1915

DUROMETER

VARIOUS MODELS FOR TESTING THE ENTIRE RANGE

TECHNICAL DATA ON REQUEST

THE SHORE INSTRUMENT & MFG. CO., INC.

90-35 VAN WYCK EXPRESSWAY
JAMAICA 2, N. Y.

NEW and REBUILT MACHINERY

Since 1891

L. ALBERT & SON

Trenton, N. J., Akron, Ohio, Chicago, Ill., Los Angeles, Calif.

GUARANTEED REBUILT MACHINERY

IMMEDIATE DELIVERIES FROM STOCK

MILLS, CALENDERS, TUBERS
VULCANIZERS, ACCUMULATORS
HYD. PRESSES, PUMPS, MIXERS
CUTTING MACHINES, PULVERIZERS

UNITED RUBBER MACHINERY EXCHANGE

183-189 ORATON ST. CABLE "URME" NEWARK 4, N. J.

U. S. Imports, Exports, and Reexports of Crude and Manufactured Rubber

Imports for Consumption of Crude and Manufactured Rubber

	March, 1953	
	Quantity	Value
UNMANUFACTURED, LBS.		
Crude rubber	112,256,671	$28,724,364
Latex	14,942,280	4,733,320
Jelutong or Pontianak	188,774	74,828
Balata	217,928	83,918
Gutta percha	48,283	44,791
Crude chicle	35,600	22,278
Synthetic rubber	3,455,162	864,928
Reclaimed rubber	593,879	37,759
Scrap rubber	2,549,873	111,585
TOTALS	134,288,450	$34,697,771
MANUFACTURED		
Rubber tires		
Auto, etc. *no.*	6,073	$353,323
Bicycles *no.*	2,456	3,773
Inner tubes		
Auto, etc. *no.*	940	3,161
Footwear		
Boots *prs.*	15,798	24,714
Shoes and overshoes *prs.*	30,700	17,035
Rubber-soled canvas shoes *prs.*	3,959	4,681
Athletic balls		
Golf *no.*	43,512	12,312
Tennis *no.*	44,712	9,459
Other *no.*	65,760	9,447
Toys	.....	33,179
Hard rubber goods		
Combs *no.*	26,826	3,225
Drug sundries	.....	1,132
Other	.....	3,548
Rubberized printing blankets *lbs.*	521	1,007
Rubber and cotton packing *lbs.*	4,027	6,087
Gaskets and valve packing	.....	3,779
Molded insulators	.....	21,191
Belting *lbs.*	3,409	5,727
Hose and tubing	.....	10,010
Gloves *prs.*	76,584	18,832
Nipples and pacifiers *gr.*	4,965	7,633
Instruments *doz.*	3,874	9,843
Heels and soles *lbs.*	4,829	1,134
Bands *lbs.*	2,390	1,243
Other	.....	452
Gutta percha manufactures *lbs.*	2,340	2,504
Synthetic rubber products	.....	4,981
Other soft rubber goods	.....	173,198
TOTALS	.....	$746,610
GRAND TOTALS, ALL RUBBER EXPORTS	.....	$35,444,381

Exports of Domestic Merchandise

	March, 1953	
	Quantity	Value
UNMANUFACTURED, LBS.		
Chicle and chewing gum bases	555,837	$243,130
Balata, gutta percha, etc.	7,136	7,278
Synthetic rubbers		
GR-S type	1,227,828	318,976
Butyl	1,000	247
Neoprene	2,082,404	870,849
Nitrile type	476,408	243,593
Other	49,591	37,480
Reclaimed rubber	2,498,041	214,476
Scrap rubber	2,527,408	68,315
TOTALS	9,425,653	$2,004,334
MANUFACTURED		
Rubber cement *gals.*	79,402	$153,505
And rubberized fabric *sq. yds.*	221,314	210,360
Clothing	.....	170,857
Footwear		
Boots and shoes *prs.*	23,026	74,874
Rubber-soled canvas shoes *prs.*	25,575	50,426
Heels *doz. prs.*	75,339	88,143
Soles, soling, toplift sheets *lbs.*	738,505	220,136
Gloves and mittens *doz. prs.*	14,917	64,368
Drug sundries	.....	189,810
Toys, balls, novelties	.....	42,363
Hard rubber goods		
Battery boxes *no.*	32,879	51,847
Other electrical goods *lbs.*	161,816	134,018
Other	.....	30,287
Rubber tires and casings		
Truck and bus *no.*	55,062	3,242,145
Auto and motorcycle *no.*	41,184	533,193
Aircraft *no.*	1,969	96,507
Off-the-road *no.*	11,349	1,184,741
Farm tractor *no.*	4,792	220,993
Implement *no.*	1,481	30,511
Other *no.*	5,576	47,423
Inner tubes		
Auto *no.*	19,017	36,954
Truck and bus *no.*	49,891	387,697
Aircraft *no.*	1,245	6,852
Other *no.*	12,431	57,229
Solid tires: truck and commercial *no.*	1,614	31,080
Tire repair material		
Camelback *lbs.*	565,444	167,691
Other *lbs.*	401,186	342,808
Tape, except medical and friction *lbs.*	58,490	46,861
Belting		
V-type, auto, fan *lbs.*	79,614	109,384
Transmission		
V-belt *lbs.*	103,787	222,341
Flat belts *lbs.*	87,141	128,644
Conveyor and elevator *lbs*	210,626	201,761
Other *lbs.*	5,165	12,619
Hose		
Molded and braided *lbs.*	316,847	269,495
Wrapped and hand built *lbs.*	167,587	176,821
Other hose and tubing *lbs.*	89,294	105,137
Packing		
Sheet type *lbs.*	37,550	31,651
Other *lbs.*	120,217	184,411
Tiling and flooring *lbs.*	115,499	32,972
Mats and matting *lbs.*	393,572	113,256
Thread		
Bare *lbs.*	24,283	39,262
Textile covered *lbs.*	18,847	45,481
Compounded rubber for further manufacture *lbs.*	222,228	163,852
Other rubber manufactures	.....	683,591
TOTALS	.....	$10,434,357
GRAND TOTALS, ALL RUBBER EXPORTS	.....	$12,438,691

SOURCE: Bureau of the Census, United States Department of Commerce, Washington, D. C.

Reexports of Foreign Merchandise

	March, 1953	
	Quantity	Value
UNMANUFACTURED, LBS.		
Crude rubber	1,355,653	$435,030
Balata, gutta percha, etc.	9,975	2,790
TOTALS	1,365,628	$437,820
MANUFACTURED		
Rubber drug sundries	.....	$853
And rubberized clothing	.....	150
Toys, balls, novelties	.....	689
Tire repair materials, except camelback *lbs.*	385	561
Other natural and synthetic rubber manufactures	.....	2,304
TOTALS	.....	$4,557
GRAND TOTALS, ALL RUBBER REEXPORTS	.....	$442,377

United States Rubber Statistics—April, 1953

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		Month-End Stocks
	Production	Imports	Total	Consumption	Exports	
Natural rubber, total	0	54,272	54,272	43,438	692	101,464
Latex, total	0	6,302	6,302	5,937	0	7,428
Rubber and latex, total	0	60,574	60,574	49,375	692	108,892
Synthetic rubbers, total	*74,176 † 8,776	1,296	84,248	77,221	1,489	122,041
GR-S types‡	*66,816 †44	1,192	68,052	61,881	414	89,839
Butyl	*7,360	104	7,464	8,057	47	19,144
Neoprene‡	†7,078	0	7,078	5,908	818	9,364
Nitrile types‡	†1,654	0	1,654	1,375	210	3,694
Natural rubber and latex and synthetic rubbers, total	82,952	61,870	144,822	126,596	2,181	230,933
Reclaimed rubber, total	28,714	318	29,032	26,483	1,261	31,263
GRAND TOTALS	111,666	62,188	173,854	153,079	3,442	262,196

*Government plant production.
†Private plant production.
‡Includes latices.
SOURCE: Rubber Division, NPA, United States Department of Commerce, Washington, D. C.

Foreign Trade Opportunities

The firms and industries listed below recently expressed their interests in buying in the United States or in United States representations. Additional information concerning each import or export opportunity, including a World Trade Directory Report, is available to qualified United States firms and may be obtained upon inquiry from the Commercial Intelligence Unit of the United States Department of Commerce, Washington, D. C., or through its field offices, for $1 each. Interested United States companies should correspond directly with the concerns listed concerning any projected business arrangements.

Export Opportunities

Bonnet & Cie., 22 Rue Haxo, Marseille (Bouches-du-Rhone), France: chemical products and plastic raw materials.

Corsettenfabriek "Dulco" N.V., 1-3 Regentesseplein, The Hague, Netherlands: elastic fabrics for corsets.

Yeramian Bros. & Sons, P. O. Box 489, Beirut, Lebanon: girdles, etc.; rainwear; infants' wear, including rubberized baby pants; materials for raincoats.

Cassano & Ciuti S.r.l., 17-6 via dei Giustiniani, Genoa, Italy: rubber goods mainly for surgical, hospital, and medical purposes; rubber toys.

Isolants du Nord, 16 Rue d'Infroy, Douai (Nord), France: all types of adhesive tapes, including electrical and transparent tapes.

Societe d'Exploitation des Etablissements Baudou, Les Eglisottes, Gironde, France: rubber goods other than tires and boots.

MEVA, 17 Balmes, Tangier, Morocco: plastic novelties.

Gualtiero Francescato, 10 Corso Plebisciti, Milan, Italy: synthetic rubber.

Representaciones del Norte, S. de R.L., Modesto Arreola 519 Ote. Altos, Monterrey, N.L., Mexico: stationery items.

Import Opportunities

Gotarps Fabriks AB., Exportkontoret, 18 Norr Malarstrand, Stockholm, Sweden: rubber-heel washers.

Manufacture d'Amiante et de Caoutchouc du Midi "Moulin de Saliens," 8bis Fabourg du Moustier, Montauban, Tarn-et-Garonne, France: compressed rubber or asbestos sheets for the manufacture of joints, glands, and packings.

Societe d'Exploitation des Etablissements Baudou, Les Eglisottes, Gironde, France: tires suitable for agricultural vehicles, hand trucks, and wheelbarrows; rubber boots for sports and industrial uses.

Hiri Hildebrand & Richter, 68 Wrestedt, Wrestedt/Uelzen, Germany: foam rubber and foam-rubber plastics; synthetic upholstery materials.

The Yokohama Silk Co., Ltd., 92, 3-chome, Suehirocho, Nakaku, Yokohama, Japan: beach playthings; toys.

J. Mandleberg & Co., Ltd., Albion Works, Pendleton, Manchester, England: rainproof garments for men, women, and children.

Anton H. Schierenbeck, 26 Luermanstrasse, Bremen, Germany: rubber items such as dolls, toys, balloons, balls, tires and tubes for bicycles, hygienic goods, and rubber impregnated cloths.

Herbert Olbrich & Co., 60 Osterstrasse, Bocholt, Germany: machines for the rubber and the textile industries.

Latex Gummi-Werk G.m.b.H., Industriehof, Brake/Unterweser, Germany: rubber and foam rubber products such as toys, hygienic goods, cushions, gloves, shoulder pads, and upholstery materials.

MACHINERY AND SUPPLIES FOR SALE (Continued)

FOR SALE—RUBBER EQUIPMENT OF CABLE PLANT

The following can be seen now in operation, available in three to five months: 2—60″ Thropp mills. 1—40″ mill. 2—60″ mill blenders, oscillating type. 1 Batch-off machine with festoon rack. 3—6″ National Erie strainers. 1—8½″ National Erie strainer. 2 Farrel-B. 48″ mills, forced feed lubrication, tandem drive, with 150 HP Westinghouse motor. 3 respoolers. Various 18″ steel reels. Bale cutter. Rubber racks. 1 vulcanizer, 60″ x 13′, horizontal drum type with Foxboro automatic controls. 2 Royle #1 extruders. Motors for all above equipment, 550V-3P-60C, except above 8½″ strainer, which has 125 HP-440V. FOREIGN INQUIRIES INVITED. Address Box No. 1350, care of INDIA RUBBER WORLD.

MACHINERY AND SUPPLIES WANTED

WANTED: RUBBER MACHINERY INCLUDING BANBURY Mixers, Heavy-Duty Mixers, Calenders, Rubber Rolls & Mixers. Extruders, Grinders & Cutters, Hydraulic Equipment, Rotary and Vacuum Shelf Dryers, Injection Molding Machines. Will consider a now-operating or shut-down plant. P. O. Box 1351, Church Street Sta., New York 8, N. Y.

WANTED: RUBBER MILLS, CALENDERS, MIXERS, BANbury Mixers, Extruders, Grinders, Cutters, Hydraulic Presses, Injection Molding Machines. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York 38, N. Y. BArclay 7-0600.

WANTED: VERTICAL POT VULCANIZER, APPROXIMATELY four-foot diameter and approximately five to six feet deep with automatic shut-type door; a Rubber Roll and Tube Grinder with approximately 24″ centers; a Rubber Wet-Saw, and a Thropp Washer Cutter. Address Box No. 1352, care of INDIA RUBBER WORLD.

WANTED: USED SCOTT TESTER MODEL L4; ALSO HYdraulic Press, laboratory size. JOHN F. COWAN & ASSOCIATES, 22 Cambria Street, Boston 15, Mass.

BUSINESS OPPORTUNITIES

CUSTOM MIXING

Surplus capacity available to customers' specifications on No. 3A Banbury Type Machine. We are manufacturers of Molded, Lathe Cut, and Extruded Soft Rubber Goods and have surplus mixing capacity.

MARTIN RUBBER COMPANY
Long Branch Ave., Long Branch, N. J.
Telephones: Long Branch 6-1221-1222

MANUFACTURING BUSINESS WANTED

We are now manufacturing over $20,000,000 in various lines and wish to expand by acquisition of assets or stock of one or more industrial companies. In our negotiations the sellers' problems and wishes will receive full consideration. Present personnel will normally be retained.
Address all replies "confidentially" C. J. GALE, Sec., 233 Broadway, New York 7, N. Y. BArclay 7-1819.

Rubber Plastic Synthetics
Precision Workmanship
CALENDERING & MIXING
Rubber & Plastics: Calendering, Mixing, Grinding & Pulverizing
AS YOU WANT IT. QUICK SERVICE
The Elm City Rubber Co. P. O. Box 1864
New Haven, Conn. Tel. Spruce 7-3437

CUSTOM MIXING

We have capacity to mix white or light colored stocks to customers' specifications on No. II Banbury.

LOVELL MANUFACTURING COMPANY
Erie, Pa. • Telephone 4-0141

GOOD USED MACHINERY

WANTED: YOUR IDLE EQUIPMENT

1—Farrel Birmingham 6″ x 13″ self-contained 3-roll Calender, m.d.
1—6″ x 12″ Laboratory Mill, m.d.
2—Ball & Jewell #2 Rotary Cutters; 1—#1; 1, with 3 h.p. motor.
4—#28 Devine Vac. Shelf Dryers, 19-59″ x 78″ shelves, complete.
1—16″ x 42″ Rubber Mill, m.d.
4—Bolling 18″ x 18″, 5-opening Hydraulic Presses, 10″ dia. ram.
1—6′ x 24′ Vulcanizer quick opening door.
1—Royle #4, 6″ Extruder; 1—#1, with chrome plated screw, m.d.
1—Patterson S/S 110 gal. Vacuum Mixer, Sigma Blades.
1—B.P. 20 gal. Jacketed Mixer, Double Sigma Blades.
1—400-gal. closed jack. Nickel Kettle.

Also other sizes Hydraulic Presses, Tubers, Banbury Mixers, Mills, Vulcanizers, Calenders, Pellet Presses, Cutters.

PHONE—WIRE—WRITE • *Send us your inquiries*

Consolidated Products Company, Inc.
13-16 Park Row, New York 38, N. Y. BArclay 7-0600
Cable Address: Equipment N.Y.
"Our 36th Year"

HOWE MACHINERY CO., INC.
30 GREGORY AVENUE PASSAIC, N. J.
Designers and Builders of
"V" BELT MANUFACTURING EQUIPMENT
Cord Latexing, Expanding Mandrels, Automatic Cutting, Skiving, Flipping and Roll Drive Wrapping Machines.
ENGINEERING FACILITIES FOR SPECIAL EQUIPMENT
Call or write.

AIR BAG BUFFING MACHINERY
STOCK SHELLS HOSE POLES
MANDRELS
NATIONAL SHERARDIZING & MACHINE CO.
868 WINDSOR ST. HARTFORD, CONN.
Representatives
Akron San Francisco New York

MIXING
To Your Specification
K. B. C. INDUSTRIES, INC. NEW HAVEN, CONN.
881 State Street Tel: State 7-5662
Otto J. Lang, General Manager

Custom Mixing RUBBER-PLASTICS

We do milling and compounding of all types—black or color—master batches

All mixing done under careful supervision and laboratory control.

Phone: Butler 9-0400

Pequanoc Rubber Co.
MANUFACTURERS OF RECLAIMED RUBBER
MAIN SALES OFFICE and FACTORY: BUTLER, N. J.

"National security is impossible without financial security of individual citizens..."

FRED MAYTAG
The Maytag Company

"Ingenious research and the ability to produce . . . which have helped to make the United States the world's greatest nation . . . could not have been realized without the savings of millions of thrifty persons. Savings of individuals financed new inventions, developed others. The Payroll Savings Plan for purchasing Savings Bonds regularly provides an easier way for American workers to save for future spending or investment, for their own security, and for their nation's security. Our experience at the Maytag Company has shown us that a successful Payroll Savings program can be the foundation and the cornerstone of happy employee relations."

Let's point up Mr. Maytag's concise summary of the Payroll Savings Plan with a few very recent figures:

• at the close of February, 1953, the *cash value* of Series E Bonds held by *individuals* reached a new high: $35.5 billion. This is $1 billion more than the value of the Bonds held on May 1, 1951, when E Bonds began to mature.

• to this encouraging reservoir of future purchasing power, 8,000,000 Payroll Savers are adding $160,000,000 per month by their consistent investment in U.S. Savings Bonds.

• unit sales of E Bonds in 1952 reached the highest level of the past six years—more than 77 million individual pieces. Of the 77 million units, 67 million were in the $25 and $50 denominations—the bonds bought chiefly by Payroll Savers.

• Payroll Savers are serious savers—of the approximately $6 billion Series E Bonds which had become due up to the end of March, $4.5 billion, or 75%, were retained by their owners beyond maturity.

If you are not among the 45,000 companies that make the benefits of the Payroll Savings Plan available to their employees . . . or if you do have a Plan and your employee participation is less than 50%, a telegram or letter to Savings Bond Division, U.S. Treasury Department, Washington Building, Washington, D. C., will bring you all the information and assistance needed to build a *good* Payroll Savings Plan.

The United States Government does not pay for this advertisement. It is donated by this publication in cooperation with the Advertising Council and the Magazine Publishers of America.

India RUBBER WORLD

INDEX TO ADVERTISERS

This index is maintained for the convenience of our readers. It is not a part of the advertisers' contract and INDIA RUBBER WORLD *assumes no responsibility to advertisers for its correctness.*

A

Ace Machine & Mould Co., Inc. 679
Adamson United Co. ..... —
Aetna-Standard Engineering Co. 578, 579
Akron Equipment Co., The —
Akron Rubber Machinery Co. 695
Albert, L., & Son 695
Alco Oil & Chemical Corp. 614
Aluminum Flake Co. 686
American Cyanamid Co., Calco Chemical Div. 667
American Resinous Chemicals Corp. 683
American Zinc Sales Co. .. 577
Ames, B. C., Co. ..... —
Argus Chemical Laboratory —

B

Baird Rubber & Trading Co., Inc. ..... —
Baker Castor Oil Co., The —
Barco Manufacturing Co. .. 674
Barr Rubber Products Co., The 688
Barrett Division (Allied Chemical & Dye Corp.) .. —
Barry, B. J., & Co. 674
Barry, Lawrence N. 695
Berlow & Schlosser Co. 686, 688
Binney & Smith Co. Insert 643, 644
Black Rock Mfg. Co. 677
Blaw-Knox Co. ..... —
Bolling, Stewart, & Co., Inc. —
Bonwitt, Eric ..... —
Bridgwater Machine Co., The (Athens Machine Division) 562
Brockton Tool Co. ..... —
Brooklyn Color Works, Inc. 686
Burgess Pigment Co. 572

C

Cabot, Godfrey L., Inc. Front Cover, 603
Carbide & Carbon Chemicals Co., A Division of Union Carbide & Carbon Corp. —
Carey, Philip, Mfg. Co., The —
Carter Bell Mfg. Co., The. 689
Claremont Waste Mfg. Co. 680
CLASSIFIED ADVERTISEMENTS 693, 695, 697
Cleveland Liner & Mfg. Co., The .....Back Cover
Colledge, E. W., General Sales Agent, Inc. 684
Columbia-Southern Chemical Corp. 607
Columbian Carbon Co. Insert 643, 644
Columbian Carbon Co. Mapico Color Division ... —
Consolidated Products Co., Inc. 697
Continental Carbon Co. 612, 613
CONSULTANTS & ENGINEERS 688

D

D P R, Incorporated, A Subsidiary of H. V. Hardman Co. 676
Davis-Standard Sales Corp. —
Dayton Rubber Co., The .. 678
Diamond Alkali Co. 592
Dow Corning Corp. 669
du Pont de Nemours, E. I., & Co., Inc.:
Aromatics Section ... 594
Grasselli Chemicals Dept. —
Polychemicals Dept. .. 581
Rubber Chemicals Div. Inside Front Cover

E

Eagle-Picher Co., The 670
Elm City Rubber Co., The . 697
Emery Industries, Inc. .... —
Erie Engine & Mfg. Co. .. 687
Erie Foundry Co. ..... —

F

Farrel-Birmingham Co., Inc. 611
Ferry Machine Co. 682
Fidelity Machine Co., Inc.. 602
Flexo Supply Co., The .... —
Foxboro Co., The 681
French Oil Mill Machinery Co., The ..... —

G

Gale, C. J. 697
Gammeter, W. F., Co., The 688
Gelb, R., & Sons, Inc. 695
General Atlas Division of Cabot Carbon Co. 595
General Electric Co. .. 586, 587
General Latex & Chemical Corp. 678
General Magnesite & Magnesia Co. 680
General Tire & Rubber Co., The 691
Genseke Brothers 601
Gidley Laboratories, Inc. .. 688
Glidden Co., The (Chemicals, Pigments, Metals Division) 583
Goodrich, B. F., Chemical Co. (Hycar) 559
Goodyear Tire & Rubber Co., Inc., The (Chemical Division) 563, 565

H

Hadley Bros.—Uhl Co. ... —
Hale & Kullgren, Inc. 578, 579, 688
Hall, C. P., Co., The 673
Hardesty Chemical Division, W. C. Hardesty Co., Inc. —
Harwick Standard Chemical Co. 591
Heveatex Corp. 606
Hoggson & Pettis Mfg. Co., The ..... —
Holliston Mills, Inc., The .. 610
Holmes, Stanley H., Co. .. 604
Home Rubber Co. 691
Howe Machinery Co., Inc. 697
Huber, J. M., Corp. 616

I

Independent Die & Supply Co. ..... —
Indoil Chemical Co. 569
Industrial Ovens, Inc. 582
Injection Molders Supply Co. 676
Institution of the Rubber Industry 602
Interstate Welding Service 584, 585

J

Johnson Corp., The 670

K

K. B. C. Industries, Inc. .. 697

L

Lambert, E. P., Co. 610
Link Engineering Co. .... —
Lovell Manufacturing Co. . 697

M

Maimim, H., Co., Inc. 672
Marbon Corp. 671
Marine Magnesium Products Division of Merck & Co., Inc. ..... —
Martin Rubber Co. 697
Monsanto Chemical Co. .. 665
Morris, T. W., Trimming Machines ..... —
Muehlstein, H., & Co., Inc. 567

N

National Rubber Machinery Co. 597
National Sherardizing & Machine Co., The 697
National Standard Co., The 590
Naugatuck Chemical Division of U. S. Rubber Co. 561, 589
Neville Co., The 605
New Jersey Zinc Co., The 598

O

OPW Corp. 684
Oronite Chemical Co. 566
Osborn Manufacturing Co., The 568

P

Pan American Chemicals, Division Pan American Refining Corp. 675
Paterson Parchment Paper Co. 685
Pennsylvania Industrial Chemical Corp. ..... —
Pequanoc Rubber Co. 697
Phillips Chemical Co. 560, 668, 681, 689
Pike, S. J., & Co., Inc. 675
Pittsburgh Coke & Chemical Co. ..... —

R

Rand Rubber Co. 688
Rare Metal Products Co. .. 691
Richardson, Sid, Carbon Co. 700
Rotex Rubber Co., Inc. ... —
Royle, John, & Sons 614
Rubber Corp. of America .. 668
Rubber Regenerating Co., Ltd., The ..... —

S

St. Joseph Lead Co. 588
Saniseal Mfg. Co., The ... —
Schulman, A., Inc. Inside Back Cover
Scott Testers, Inc. 686
Sharples Chemicals Inc. 593
Shaw, Francis, & Co., Ltd. 606
Shell Oil Co. 599
Shore Instrument & Manufacturing Co., Inc., The 695
Skelly Oil Co. ..... —
Snell, Foster D., Inc. 688
Southeastern Clay Co. ..... —
Southern Clays, Inc. 564
Spadone Machine Co., Inc. —
Stamford Rubber Supply Co., The 679
Stauffer Chemical Co. ..... —
Struthers Wells Corp. 570
Sun Oil Co. 663

T

Tanney-Costello, Inc. ..... —
Taylor Instrument Cos. .... —
Taylor Stiles & Co. ..... —
Thiokol Chemical Corp. 574
Thomaston Mills 672
Timken Roller Bearing Co., The 661
Titanium Pigment Corp. ... 596
Tumpeer Chemical Co. ... 691
Turner Halsey Co. 615

U

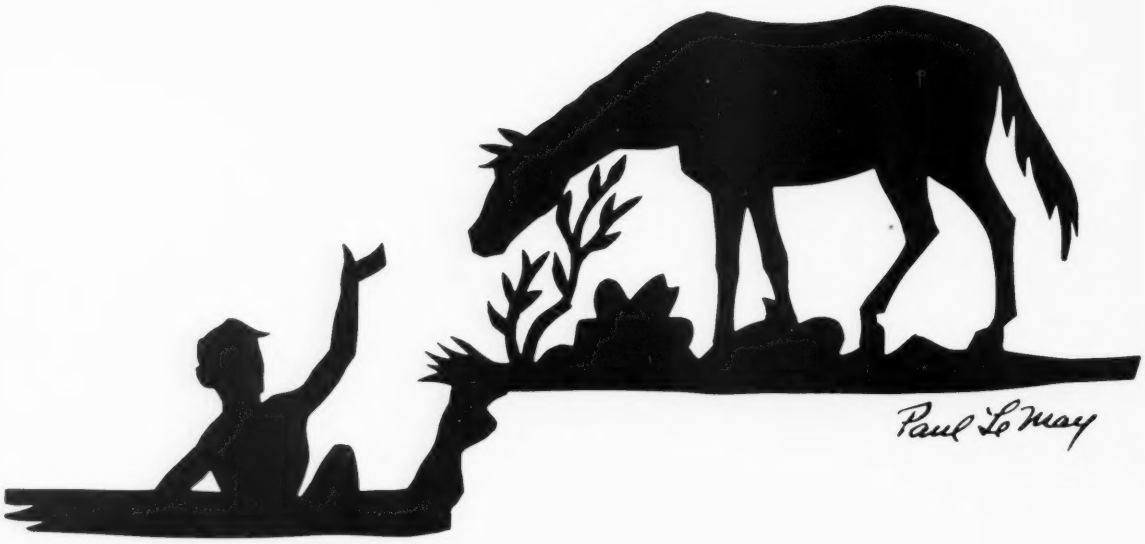
Union Carbide & Carbon Corp., Carbide & Carbon Chemicals Co. ..... —
United Carbon Co., Inc. Insert 575, 576
United Engineering & Foundry Co. 573
United Rubber Machinery Exchange 695
U. S. Rubber Reclaiming Co., Inc. 571

V

Vanderbilt, R. T., Co., Inc. 618

W

Wade, Levi C., Co. 686
Wellington Sears Co. 580
White, J. J., Products Co. 677
Whittaker, Clark & Daniels, Inc. ..... —
Williams, C. K., & Co., Inc. —
Wilson, Charles T., Co., Inc. 682
Witco Chemical Co. .. 612, 613
Woloch, George, Co., Inc. . 604
Wood, R. D., Co. ..... —



...time for relaxation

Only when you have an assured supply of top quality channel black is there time for relaxation. As gas supplies are diverted away from channel black plants to pipe lines, users of channel black are relying more and more on the Sid Richardson Carbon Co. for a long-time dependable supply.

Our own nearby abundance of natural gas and the world's largest channel black plant are your assurance of a *continuing supply* of top-quality, uniform, economical-to-use ***TEXAS "E"*** and ***TEXAS "M"*** channel blacks.

TEXAS
CHANNEL BLACKS

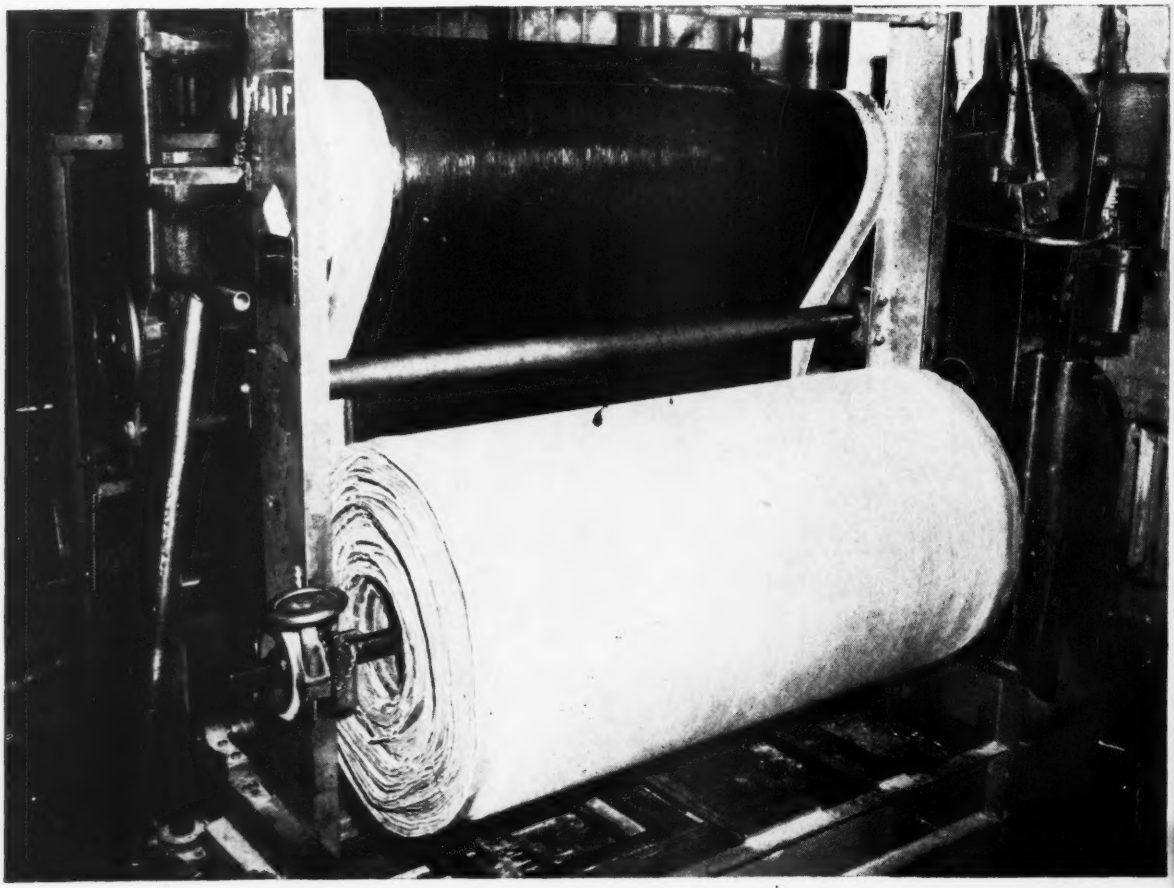
Sid Richardson
CARBON CO.

FORT WORTH, TEXAS

GENERAL SALES OFFICES
EVANS SAVINGS AND LOAN BUILDING
AKRON 8, OHIO

C

A. Schulman Inc.
25TH
ANNIVERSARY
PLASTICS
CRUDE RUBBER
HARD RUBBER DUST
SCRAP RUBBER
• NEW YORK CITY
53 East 34th St.
Murray Hill 5-8388
• AKRON, OHIO
790 E. Tallmadge
HEmlock 4124
• BOSTON, MASS.
738 Statler Bldg.
LIberty 2-2717
• E. ST. LOUIS, ILL.
14th & Converse
BRidge 5326
• A. SCHULMAN INC., LTD.
Ibex House Minories
LONDON E. C. 3, ENGLAND
Telephone: Royal 4989
• A. SCHULMAN (USA) GmbH
Bolco Building • Hinuberstrasse 18
HANOVER, GERMANY
Telephone: 21551



CLIMCO PROCESSED LINERS

Eliminate Adhesions at the Bias Cutter

If your stock has been stored in a Climco Processed Liner, you can depend on easier, faster production, and the stock always separates from the liner cleanly, easily.

And Climco Processed Liners preserve the tackiness of the stock; exclude mold, bloom and sunlight. Rejects and losses due to gauge distortion are sharply reduced.

To speed production and to lengthen liner life, Climco Processing has been accepted in the rubber industry for 31 years. For superior liners, try Climco Processed Liners.

THE CLEVELAND LINER & MFG. CO.
5508 Maurice Ave. • Cleveland 27, Ohio

GET THE FULL STORY ON CLIMCO PROCESSING

Illustrated booklet tells about Climco Liners and Linerette separating paper. Tells how to get better service from liners. Write for your copy now.

LINERETTE INTERLEAVING PAPER
Treatment Contains
NO OIL OR WAX
Samples on Request

CLIMCO
PROCESSED LINERS

FOR FASTER, BETTER PRODUCTION AT LOWER COST